83rd Annual Research Report
RICE RESEARCH STATION

Crowley, Louisiana
1991

LOUISIANA
AGRICULTURAL EXPERIMENT STATION
Kenneth W. Tipton, Vice Chancellor & Director

LOUISIANA STATE UNIVERSITY
AGRICULTURAL CENTER
H. Rouse Caffey, Chancellor

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURE RESEARCH SERVICE
COOPERATING

TABLE OF CONTENTS

TABLE OF CONTENTS
(continued)

TABLE OF CONTENTS
(continued)

TABLE OF CONTENTS
(continued)

INTRODUCTION

Research work at the Rice Research Station, Crowley, Louisiana, is conducted cooperatively by the Louisiana Agricultural Experiment Station and the United States Department of Agriculture, Agricultural Research Service. The 1991 rice research program included breeding, biotechnology, variety testing, production and distribution of foundation seed, fertilization, soil and water management, cultural practices, weed control, insect studies, disease investigations, rice drying, bird control in rice, and physiology studies. A new research program, biological control of rice insects, was initiated in 1991. Forages and crops grown in rotation with rice were evaluated relative to increasing the efficiency of land use. The aquaculture research program places emphasis upon production practices, crawfish forages, and multi-cropping of crawfish with agronomic crops. Although most of the research work was performed by members of the Rice Station staff, several staff members from Baton Rouge conducted research at this station.

The research activities of this station include both fundamental and applied research, although the latter predominates due to the mission of the Rice Research Station. Research accomplishments and general progress of the Rice Station during 1991 are presented in this report representing the 83nd Annual Research Report of the Rice Research Station, Louisiana Agricultural Experiment Station, Louisiana State University Agricultural Center.

In addition to research responsibilities of the Rice Research Station staff and cooperators, a large number of farmers, extension personnel, and others were trained and otherwise contacted during 1991. Approximately 750 persons attended the annual Rice Research Station field day to view plots and participate in discussions of research findings. Field days were also conducted in East Carroll, Morehouse, and Vermilion parishes. In addition, the staff participated in industry meetings, both on and off the station, and worked individually with farmers and others in solving immediate problems. Several thousand people received services from the Rice Research Station during 1991.

Projects at this station are conducted under the supervision of research scientists from the Rice Research Station and also by cooperating personnel from certain departments of the Louisiana Agricultural Experiment Station. Following the reports, station personnel and cooperators in 1991 are listed.

MONTHLY RAINFALL DATA
RICE RESEARCH STATION - CROWLEY, LA
1991

DATE	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	YEAR TOTAL
1			.47						.80		.76		
2			.50			.10	.49		.10			.20	
3	2.00		.30									1.28	
4					.10		1.30		.71				
5		2.93			.50		.10		.13				
6						.79	.20		.56				
7	1.10					.88	.70		.10				
8					1.66		.70	.05			.43	.10	
9	.17				1.83		.03	.13	.10				
10	1.70				1.23	.42	.13					.09	
11	3.00			.60	.30	.92		.10					
12						1.16		1.90	.01				
13			.02			.08		.09					
14				.30				.01				1.30	
15	.50			4.40	1.85								
16			.30		.33		1.07		.50				
17			.90										
18				.17		.11					.30		
19	1.60	.12				.57	.39	.60			.02		
20		1.70			.10	.04	.20				1.14		
21		.80	.02		.30	.09					.03		
22		.70			.05	.50							
23							.55			.01			
24	.72				1.59					2.19			
25	.23				.10	.70			.57				
26		.15		.95		.02				.10			
27				.70		.04	1.00	.32		.40	.03		
28	.20				.08	.64							
29	.02		.30	1.40	.10		.20			.03			
30	.60			.39	1.32					2.00			
31	.10				.70			.70		.30			
MONTH TOTAL	11.94	6.40	2.81	8.91	12.14	7.06	7.06	3.90	3.58	5.03	2.70	2.97	74.51
1990	11.26	7.98	6.06	2.96	4.60	1.91	4.03	1.59	4.14	2.42	2.83	4.80	54.58

RICE BREEDING

DEVELOPING SUPERIOR RICE VARIETIES FOR LOUISIANA[1]

S.D. Linscombe, F. Jodari, A.P. Fabacher, R.P. Frey,
R.J. Guidry, C.G. Gravot, H.L. Hoffpauir, and R. Pollingue

The rice variety development program at the Rice Research Station (RRS) is carried out primarily under LAES Project 2760. The objectives of this project are as follows:

1. To develop superior rice varieties for Louisiana production with emphasis on improvements in yield, quality, lodging resistance, seedling vigor, disease and insect resistance, earliness, ratoon production, and fertilizer responsiveness.

2. To develop and/or improve methods of rice breeding, selection, and evaluation.

3. To conduct genetic studies with implications for rice varietal development.

The 1991 rice breeding nursery included 29,800 breeding rows, 215 F_1 transplant populations, 201 F_2 bulk populations, and approximately 2,546 yield plots (on-station). Off-station testing added another 732 plots to the testing program.

The artificial hybridization program included 218 initial crosses and backcrosses for varietal improvement. Germplasm increase populations of 98 lines were grown for seed increase and purification. Four thousand, one hundred and forty-two diverse genotypes were evaluated for crawfish forage potential in cooperation with Dr. Ray McClain, Aquaculture project (RRS).

In cooperation with the Rice Biotechnology project, under the direction of Dr. Timothy Croughan, 6,000 anther cultured derived populations were screened and advanced. These lines were derived from 118 unique segregating populations.

Pest evaluations of promising selections are being conducted by cooperating research projects. Particular emphasis is being placed on trying to incorporate higher levels of disease resistance, especially to sheath blight and blast, into breeding lines. In

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[1] This project is supported in part by funds provided by rice producers through the Louisiana Rice Research Board.

cooperation with Dr. Don Groth, RRS Pathology project, Dr. Fleet Lee, University of Arkansas, Stuttgart; Dr. Tony Marchetti, USDA-ARS, Beaumont, TX; and Dr. Elcio Guimaraes, International Center for Tropical Agriculture (CIAT), Cali, Columbia, advanced breeding lines were evaluated for susceptibility to several major rice diseases. Several advanced and preliminary yield lines were evaluated for resistance to damage caused by the rice water weevil. This work was done in cooperation with the USDA-ARS Rice Entomology project under the direction of Mr. George Trahan. Advanced experimental lines were evaluated for resistance to the physiological disorder straighthead by Dr. Pat Bollich, Rice Fertilization and Cultural Management project at the RRS. Several sheath blight tolerant experimental lines were evaluated in the preliminary yield program. These lines were developed in cooperation with Dr. Chuck Rush and Dr. QingJun Xie. These lines were developed using LSBR-5, a sheath blight resistant germplasm source. LSBR-5 is a somaclonal variant of Labelle that displays excellent sheath blight tolerance. A number of the more promising lines from this group will be moved to advanced testing.

Several advanced experimental lines were evaluated for seedling vigor and response to gibberellic acid seed treatment by the RRS Physiology project under the direction of Dr. Richard Dunand.

Off-station tests of advanced experimentals were conducted in East Carroll, Morehouse, Rapides, Tensas, and Vermilion parishes. These tests provide needed information on the performance of advanced experimental lines in different environments. Five advanced experimentals were tested in nitrogen rate studies by the Rice Fertilization and Cultural Management project in cooperation with Dr. Pat Bollich. These included an early maturing, semidwarf long grain (LA 2207), an early maturing conventional long grain (LA 2146), a very early maturing, semidwarf long grain (LA 2031), an early maturing, semidwarf medium grain (LA 2214), and an early maturing, semidwarf, aromatic long grain (LA 2215). LA 2207 (Cypress) and LA 2214 (Bengal) will be released as commercial varieties for the 1992 growing season.

COOPERATIVE UNIFORM REGIONAL RICE NURSERY (URN)

Public rice breeders in the United States conduct cooperative yield nurseries in which experimental lines and commercial varieties are grown and evaluated at research locations in Arkansas, Louisiana, Mississippi, Texas, Florida, and California. The nurseries are grown to test adaptation of the entries in the diverse rice growing environments of the U.S. The entries in the 1991 nursery included material from Arkansas, California, Louisiana, Mississippi, Texas, and some cultivars from foreign countries. Because of poor first crop harvest conditions leading to severe rutting, ratoon cropping was not attempted. Information on performance characteristics is compiled and stored in the Rice Data Bank by the Department of Experimental Statistics, Louisiana Agricultural Experiment Station, LSU Agricultural Center.

Experiment: Uniform Regional Nursery - Group I

Location: Rice Research Station

Seeding Rate/Date: 150 lb/A, Apr 2, 1991

Planting Method: Water-seeded (pre-germinated seed)

Fertilization: 100-50-50 (lb/A N-P_2O_5-K_2O) preplant incorporated, Mar 26; 21 lb N/A, May 20; 21 lb N/A, May 27

Plot Size: 4.66 x 18 ft (84 ft^2)

Water Management: Flooded, Mar 28; drained, Apr 7; reflooded, Apr 11; drained, Apr 21; reflooded, Apr 24; harvest drainage, July 16

Herbicides: Stam (propanil) 3 lb ai/A + Basagran (bentazon) 1 lb ai/A, Apr 23; Londax (bensulfuron-methyl) 1.0 oz ai/A, May 5

Insecticides: Furadan (carbofuran) 0.6 lb ai/A, May 16

Harvest: July 31 and Aug 1

Experimental Design: Randomized complete block with four replications

Comments: Yields and milling yields were low primarily because of severe levels of sheath blight, blast, and weather-induced sterility. Entries 2, 5, 8, and 11 are Louisiana entries (Table 1).

TABLE 1. AGRONOMIC PERFORMANCE OF 1991 UNIFORM RICE NURSERY, GROUP I. CROWLEY, LA.

1991 ENTRY	PEDIGREE	SEEDLING VIGOR*	DAYS TO 50% HEADING	HEIGHT (IN)	LODGING (%)	YIELD (LB/A)	DUNCAN'S TEST**	MILLING % (WHL-TOT)
7	L201/7402003	5	78	46	48	6000	A	48-64
10	LBNT/STBN//NWBT	6	77	45	20	5406	AB	56-67
ROSEMONT	RSMT	5	73	37	10	5225	AB	54-67
ALAN	ALAN	4	74	45	28	5091	ABC	56-67
12	8003050/CA82Y24	6	77	38	48	5037	BC	55-68
9	8003050/CA82Y24	6	76	38	45	4978	BC	62-70
6	GCHW/LMNT//CB801	7	81	38	3	4965	BC	63-69
8	M101/MARS/3/NTAI...	5	79	39	85	4900	BCD	64-70
3	SKBT/L201	4	76	44	53	4819	BCD	55-67
TEXMONT	TXMT	6	73	36	35	4632	BCDE	53-66
2	LMNT//L202/TDCN	5	81	38	38	4411	BCDE	57-69
11	LMNT/DLLA	6	79	39	63	4176	CDEF	57-69
5	LMNT/NWBT/3/L202...	5	75	40	68	3943	DEF	55-67
MAYBELLE	MBLE	4	68	40	80	3785	EF	57-69
4	BRAZ/TBNT/3/1649...	4	79	40	88	3292	F	60-67
1	BN73/9837//PI265	5	60	36	65	613	G	55-68
C.V.		9.3	5.3	2.7	--	13.4		3.7-1.5

* SUBJECTIVE RATING 1 TO 9, WHERE 1 = EXCELLENT, 9 = POOR.
** NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

Experiment: Uniform Regional Nursery - Group II

Location: Rice Research Station

Seeding Rate/Date: 150 lb/A, Apr 2, 1991

Planting Method: Water-seeded (pre-germinated seed)

Fertilization: 100-50-50 (lb/A N-P_2O_5-K_2O) preplant incorporated, Mar 26; 21 lb N/A, May 20; 21 lb N/A, May 27

Plot Size: 4.66 x 18 ft (84 ft^2)

Water Management: Flooded, Mar 28; drained, Apr 7; reflooded, Apr 11; drained, Apr 21; reflooded, Apr 24; harvest drainage, July 20

Herbicides: Stam (propanil) 3 lb ai/A + Basagran (bentazon) 1 lb ai/A, Apr 23; Londax (bensulfuron-methyl) 1.0 oz ai/A, May 5

Insecticides: Furadan (carbofuran) 0.6 lb ai/A, May 16

Harvest: Aug 5

Experimental Design: Randomized complete block with four replications

Comments: Yields and milling were low primarily due to heavy sheath blight and blast pressure. Entries 22, 28, and 31 are Louisiana entries. Bengal is a new medium-grain variety being released for 1992 production. Entry 31 (LA 2031) is currently in increase and may be a future candidate for release (Table 2).

TABLE 2. AGRONOMIC PERFORMANCE OF 1991 UNIFORM RICE NURSERY, GROUP II. CROWLEY, LA.

1991 ENTRY	PEDIGREE	SEEDLING VIGOR*	DAYS TO 50% HEADING	HEIGHT (IN)	LODGING (%)	YIELD (LB/A)	DUNCAN'S TEST**	MILLING % (WHL-TOT)
28	SMARS/MARS//MARS	4	83	39	0	6104	A	62-68
27	V6DW/STTD//L201	5	80	46	15	6064	A	55-68
31	L202/LMNT	4	78	41	18	5972	AB	54-67
BENGAL	BNGL	3	84	39	0	5836	ABC	60-69
24	BN73/NV76//BN73/	5	82	47	0	5725	ABC	45-64
23	GCHW/LMNT//CB801	6	80	39	3	5447	ABCD	63-70
26	GCHW/LMNT//CB801	6	81	39	5	5256	ABCDE	61-69
MILLIE	MILL	4	76	45	60	5212	ABCDE	57-69
22	SMARS/MARS//MARS	4	85	39	30	4997	BCDE	58-69
30	LBNT/STBN	5	81	44	18	4972	BCDE	52-66
ORION	ORIN	4	83	42	90	4834	CDE	58-69
32	L201//TBNT/BLMT	4	74	45	80	4577	DEF	53-66
21	LBNT/9902/NWBT	5	78	43	83	4411	DEF	56-67
29	DLMT/B8462T3-710	6	79	38	70	4332	EF	51-70
TEBONNET	TBNT	5	76	49	88	3811	F	55-68
MARS	MARS	3	84	46	85	3671	F	61-68
C.V.		8.7	0.7	2.8	-	12.4		4.4-1.8

* SUBJECTIVE RATING 1 TO 9, WHERE 1 = EXCELLENT, 9 = POOR.
** NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

Experiment: Uniform Regional Nursery - Group III

Location: Rice Research Station

Seeding Rate/Date: 150 lb/A, Apr 2, 1991

Planting Method: Water-seeded (pre-germinated seed)

Fertilization: 100-50-50 (lb/A N-P_2O_5-K_2O) preplant incorporated, Mar 26; 21 lb N/A, May 20; 21 lb N/A, May 27

Plot Size: 4.66 x 18 ft (84 ft^2)

Water Management: Flooded, Mar 28; drained, Apr 7; reflooded, Apr 11; drained, Apr 21; reflooded, Apr 24; harvest drainage, July 20

Herbicides: Stam (propanil) 3 lb ai/A + Basagran (bentazon) 1 lb ai/A, Apr 23; Londax (bensulfuron-methyl) 1.0 oz ai/A, May 5

Insecticides: Furadan (carbofuran) 0.6 lb ai/A, May 16

Harvest: Aug 5

Experimental Design: Randomized complete block with four replications

Comments: Entries 42, 45, 48, and 51 are Louisiana lines. Cypress is a semidwarf early long grain being released for 1992 production (Table 3).

TABLE 3. AGRONOMIC PERFORMANCE OF 1991 UNIFORM RICE NURSERY, GROUP III. CROWLEY, LA.

1991 ENTRY	PEDIGREE	SEEDLING VIGOR*	DAYS TO 50% HEADING	HEIGHT (IN)	LODGING (%)	YIELD (LB/A)	DUNCAN'S TEST**	MILLING % (WHL-TOT)
44	TBNT/NTAI	7	82	45	0	5860	A	62-69
49	8303116/LMNT	7	77	38	8	5666	AB	55-68
CYPRESS	CPRS	5	83	40	10	5597	AB	59-68
DELLMONT	DLMT	6	85	39	3	5558	AB	58-70
LACASSINE	LCSN	6	83	38	25	5515	AB	55-68
41	TBNT/NTAI	7	82	44	88	5423	AB	61-70
43	8303116/LMNT	6	86	43	5	5402	AB	50-65
52	GCHW/LMNT//CB801	6	81	39	3	5401	AB	63-70
45	LMNT//L202/CICA8	5	82	39	25	5345	AB	49-64
LEMONT	LMNT	5	82	40	30	5233	AB	58-69
46	DLLAX2/LMNT*2	6	83	39	35	5199	AB	58-69
42	LMNT/DLLA	6	84	39	10	5169	AB	53-70
GULFMONT	GFMT	5	84	38	10	5106	AB	57-69
50	L201//TBNT/BLMT	5	85	43	0	4957	BC	52-67
47	VSTA/NTAI//LMNT	5	85	45	0	4900	BC	50-66
48	8002610/CICA9	4	85	46	0	4780	C	51-65
C.V.		10.1	1.3	3.2	–	19.2		3.6-2.0

* SUBJECTIVE RATING 1 TO 9, WHERE 1 = EXCELLENT, 9 = POOR.
** NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

Experiment: Uniform Regional Nursery - Group IV

Location: Rice Research Station

Seeding Rate/Date: 150 lb/A, Apr 3, 1991

Planting Method: Water-seeded (pre-germinated seed)

Fertilization: 100-50-50 (lb/A N-P_2O_5-K_2O) preplant incorporated, Mar 26; 21 lb N/A, May 20; 21 lb N/A, May 27

Plot Size: 4.66 x 18 ft (84 ft^2)

Water Management: Flooded, Mar 28; drained, Apr 7; reflooded, Apr 11; drained, Apr 21; reflooded, Apr 24; harvest drainage, July 20

Herbicides: Stam (propanil) 3 lb ai/A + Basagran (bentazon) 1 lb ai/A, Apr 23; Londax (bensulfuron-methyl) 1.0 oz ai/A, May 5

Insecticides: Furadan (carbofuran) 0.6 lb ai/A, May 16

Harvest: Aug 8

Experimental Design: Randomized complete block with four replications

Comments: Entries 62, 65, and 68 are Louisiana entries (Table 4).

TABLE 4. AGRONOMIC PERFORMANCE OF 1991 UNIFORM RICE NURSERY, GROUP IV. CROWLEY, LA.

1991 ENTRY	PEDIGREE	SEEDLING VIGOR*	DAYS TO 50% HEADING	HEIGHT (IN)	LODGING (%)	YIELD (LB/A)	DUNCAN'S TEST**	MILLING % (WHL-TOT)
70	L201//TBNT/BLMT	6	79	40	0	7234	A	46-69
62	M101/MARS/3/NTAI...	5	78	38	40	6507	B	60-72
72	8303116/LMNT	6	81	39	23	6500	B	55-69
65	L202/LMNT	6	79	39	5	6479	BC	53-67
71	L201//TBNT/BLMT	5	83	39	0	6416	BC	49-68
64	VSTA/NTAI/3/TTEP...	5	84	45	0	6180	BCD	54-66
68	L202/LMNT	5	80	37	3	6084	BCDE	58-69
63	8303116/LMNT	6	80	41	38	6010	BCDE	56-68
TORO-2	TRO2	5	84	44	10	5794	BCDE	60-69
67	VSTA/7901017	5	83	46	0	5761	CDE	55-66
69	SHORT RICO	5	83	46	88	5692	DEF	60-68
66	8303116/LMNT	5	80	40	55	5582	DEF	57-68
NEWBONNET	NWBT	4	83	45	0	5481	DEF	54-66
61	DAWN//BP87/9902	4	90	47	0	5402	EF	53-66
KATY	KATY	4	81	46	33	5398	EF	58-67
RICO 1	RICO 1	5	83	45	88	4992	F	59-68
C.V.		7.9	0.7	2.5	–	7.4		3.9-1.9

* SUBJECTIVE RATING 1 TO 9, WHERE 1 = EXCELLENT, 9 = POOR.
** NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

Experiment: Uniform Regional Nursery - Group V

Location: Rice Research Station

Seeding Rate/Date: 150 lb/A, Apr 2, 1991

Planting Method: Water-seeded (pre-germinated seed)

Fertilization: 100-50-50 (lb/A N-P_2O_5-K_2O) preplant incorporated, Mar 26;
21 lb N/A, May 20; 21 lb N/A, May 27

Plot Size: 4.66 x 18 ft (84 ft^2)

Water Management: Flooded, Mar 28; drained, Apr 7; reflooded, Apr 11;
drained, Apr 21; reflooded, Apr 24; harvest drainage, July 16

Herbicides: Stam (propanil) 3 lb ai/A + Basagran (bentazon) 1 lb ai/A, Apr 23;
Londax (bensulfuron-methyl) 1.0 oz ai/A, May 5

Insecticides: Furadan (carbofuran) 0.6 lb ai/A, May 16

Harvest: July 31 and Aug 1

Experimental Design: Randomized complete block with two replications

Comments: Entries 82, 85, 88, 91, 94, 97, 103, 106, 109, 112, and 115 are Louisiana entries (Table 5).

TABLE 5. AGRONOMIC PERFORMANCE OF 1991 UNIFORM RICE NURSERY, GROUP V. CROWLEY, LA.

1991 ENTRY	PEDIGREE	SEEDLING VIGOR*	DAYS TO 50% HEADING	HEIGHT (IN)	LODGING (%)	YIELD (LB/A)	DUNCAN'S TEST**	MILLING % (WHL-TOT)
94	L202/TBNT	5	81	43	0	6556	A	53-67
115	L202/TBNT	5	69	37	0	6403	AB	57-70
100	TBNT/LA110//LMNT	4	74	42	5	5880	ABC	55-66
82	M201/3/5242/UNK/...	7	78	38	0	5671	ABCD	61-68
106	L202/LMNT	5	80	37	0	5662	ABCD	49-65
93	LBNT/9902/3/DAWN...	6	82	39	0	5574	ABCD	51-67
103	M201/3/5242/UNK/...	6	76	39	0	5525	ABCD	61-67
116	LBLE/7802003//GF...	6	81	37	0	5319	ABCDE	58-68
90	ZNTH/3/164986-4/...	6	78	45	5	5317	ABCDE	63-69
104	8003050/CA82Y24/...	6	82	39	0	5217	ABCDE	51-68
86	~~DLMT/B8462T3-710~~	6	78	38	15	5195	ABCDE	49-71
92	8303181/CB801	7	81	36	0	5111	ABCDE	55-66
97	NWBT/LMNT//TBNT	6	82	39	5	5103	ABCDE	45-65
114	8203035/GCHW	4	78	42	5	5044	ABCDE	58-67
83	~~8303116/LMNT~~	7	78	38	10	4950	ABCDEF	43-64
108	L201/3/NV66/IR-8...	5	76	44	10	4915	ABCDEF	54-65
113	GFMT*2/IRGA-409	6	82	40	10	4859	BCDEF	49-67
85	LMNT/DLLA	6	79	41	50	4832	BCDEF	56-69
86	NWBT/LMNT//L202	6	80	35	0	4777	BCDEF	47-66
95	8303116/CB801	8	81	38	0	4724	BCDEF	40-65
107	GFMT*2/IRGA-409	6	83	40	5	4688	CDEF	47-66
91	80Y50/LBLE//TBNT	6	79	43	10	4646	CDEF	50-66
89	GFMT*2/IRGA-409	8	86	41	0	4641	CDEF	50-64
CM 101	CM101	5	70	36	90	4616	CDEF	66-70
98	8303116/LMNT	5	75	38	25	4546	CDEFG	53-67
112	NWBT/LMNT//L202	6	86	37	0	4429	CDEFG	48-65
LABELLE	LBLE	6	75	50	70	4424	CDEFG	55-67
SKYBONNET	SKBT	6	84	50	0	4297	CDEFG	56-66
109	LMNT*2/CR1113	6	82	43	5	4258	CDEFG	48-64
81	TBNT/LBLE//NV66	6	77	44	10	4242	CDEFG	52-66
102	V6DW/STTD//L201/...	5	73	43	40	4228	CDEFG	54-67
110	PCOS/LMNT//GFMT	6	83	39	0	4179	CDEFG	42-60
L-203	L203	4	69	37	10	4120	DEFG	45-66
105	V6DW/STTD//L201/...	5	73	44	50	4025	DEFG	56-67
84	BRAZ/TBNT/3/1649...	4	74	40	75	4015	DEFG	62-68
101	NWBT/8303181	6	81	40	0	3651	EFGH	51-65
87	V6DW/STTD//L201/...	5	71	41	25	3250	FGH	43-64
99	V6DW/STTD//L201/...	5	74	44	70	2902	GH	48-68
96	BRTB/3/164986-4/...	3	78	44	5	2892	GH	49-63
111	BN73/9837/265116	5	58	35	45	2212	H	40-66
C.V.		9.0	1.5	3.0	-	14.9		10.6-3.0

* SUBJECTIVE RATING 1 TO 9, WHERE 1 = EXCELLENT, 9 = POOR.
** NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

Experiment: Uniform Regional Nursery - Group VI

Location: Rice Research Station

Seeding Rate/Date: 150 lb/A, Apr 2, 1991

Planting Method: Water-seeded (pre-germinated seed)

Fertilization: 100-50-50 (lb/A N-P_2O_5-K_2O) preplant incorporated, Mar 26; 21 lb N/A, May 20; 21 lb N/A, May 27

Plot Size: 4.66 x 18 ft (84 ft^2)

Water Management: Flooded, Mar 28; drained, Apr 7; reflooded, Apr 11; drained, Apr 21; reflooded, Apr 24; harvest drainage, July 20

Herbicides: Stam (propanil) 3 lb ai/A + Basagran (bentazon) 1 lb ai/A, Apr 23; Londax (bensulfuron-methyl) 1.0 oz ai/A, May 5

Insecticides: Furadan (carbofuran) 0.6 lb ai/A, May 16

Harvest: Aug 5

Experimental Design: Randomized complete block with two replications

Comments: Entries 122, 125, 128, 131, 134, 137, 140, 143, 146, 149, 152, and 155 are Louisiana lines (Table 6).

TABLE 6. AGRONOMIC PERFORMANCE OF 1991 UNIFORM RICE NURSERY, GROUP VI. CROWLEY, LA.

1991 ENTRY	PEDIGREE	SEEDLING VIGOR*	DAYS TO 50% HEADING	HEIGHT (IN)	LODGING (%)	YIELD (LB/A)	DUNCAN'S TEST**	MILLING % (WHL-TOT)
133	KATY/STBN	5	80	47	0	7510	A	60-67
128	LMNT*2/8001190	6	84	38	0	6564	B	61-70
136	KATY/NWBT	6	83	48	15	6499	BC	61-68
144	8303116/LMNT	5	83	42	10	6411	BC	57-69
138	8003050/CA82Y24/...	6	83	38	0	6392	BC	61-70
130	LBNT/9902/3/DAWN...	7	86	46	0	6297	BCD	51-67
135	GCHW/LMNT//CB801	6	81	42	15	6246	BCDE	61-70
145	L201//TBNT/BLMT	4	82	47	15	6203	BCDEF	56-68
139	VSNTLM//L201/9NR	5	81	41	5	6114	BCDEFG	60-68
124	MARS/TBNT	5	78	43	0	6111	BCDEFG	63-69
152	LMNT*2/CR1113	5	84	39	5	6096	BCDEFGH	53-67
127	9680/9841//LBNT/...	5	83	46	0	6051	BCDEFGHI	50-66
155	SMARS/MARS//MARS	4	86	40	0	5995	BCDEFGHI	58-66
143	L202/NWRX	5	86	38	0	5868	BCDEFGHIJ	52-66
151	NWBT/3/DAWN/9695...	5	83	49	70	5863	BCDEFGHIJ	60-69
150	LBLE-X2-2/LMNT	7	83	36	0	5789	BCDEFGHIJ	57-68
141	86-570/PCOS//GFMT...	6	83	36	20	5777	BCDEFGHIJ	60-68
140	LMNT*2/CR1113	6	87	37	0	5769	BCDEFGHIJ	49-67
149	SMARS/MARS//MARS	4	85	39	0	5764	BCDEFGHIJ	64-70
134	L202/LEAH	5	83	38	0	5756	BCDEFGHIJ	56-67
125	M101/MARS/3/NTAI...	5	80	38	90	5755	BCDEFGHIJ	63-71
123	8003050/CA82Y24/...	6	81	40	5	5753	BCDEFGHIJ	52-68
153	PCOS/LMNT//GFMT	6	84	40	0	5731	BCDEFGHIJ	59-68
122	LMNT*2/82CAY81	5	85	43	5	5718	BCDEFGHIJ	56-66
131	M101/MARS/3/NTAI...	4	80	39	85	5551	BCDEFGHIJK	63-70
121	LBNT/STBN//NWBT	5	80	46	40	5471	CDEFGHIJKL	55-68
MERCURY	MERC	6	82	39	90	5469	CDEFGHIJKL	64-70
142	KATY/NWBT	5	82	46	40	5307	DEFGHIJKLM	59-67
126	PCOS/LMNT//GFMT	7	85	39	0	5207	EFGHIJKLM	60-69
132	8303181/CB801	7	83	37	0	5163	FGHIJKLM	60-69
129	GCHW/LMNT//CB801	7	92	41	0	5094	GHIJKLM	60-69
156	TBNT/LA110//LMNT	4	78	44	5	5048	HIJKLM	53-66
137	BRAZ/T489//MARS	4	83	42	90	5026	IJKLM	63-70
147	8303116/CB801	7	87	41	5	4829	JKLM	48-63
148	VSTA/NTAI//LMNT/...	5	80	44	75	4530	KLMN	61-67
154	MARS/NWRX//TBNT/...	4	79	46	45	4514	LMN	58-68
146	LBLE SC-5	7	86	44	0	4421	MN	57-65
REXMONT	RXMT	7	84	37	10	4346	MN	50-63
NATO	NATO	6	84	50	90	3802	NO	58-68
DELLA	DLLA	5	88	55	90	3176	O	55-66
C.V.		11.4	1.7	3.6	--	7.7		3.7-1.8

* SUBJECTIVE RATING 1 TO 9, WHERE 1 = EXCELLENT, 9 = POOR.
** NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

Experiment: Uniform Regional Nursery - Group VII

Location: Rice Research Station

Seeding Rate/Date: 150 lb/A, Apr 3, 1991

Planting Method: Water-seeded (pre-germinated seed)

Fertilization: 100-50-50 (lb/A N-P_2O_5-K_2O) preplant incorporated, Mar 26; 21 lb N/A, May 20; 21 lb N/A, May 27

Plot Size: 4.66 x 18 ft (84 ft^2)

Water Management: Flooded, Mar 28; drained, Apr 7; reflooded, Apr 11; drained, Apr 21; reflooded, Apr 24; harvest drainage, July 20

Herbicides: Stam (propanil) 3 lb ai/A + Basagran (bentazon) 1 lb ai/A, Apr 23; Londax (bensulfuron-methyl) 1.0 oz ai/A, May 5

Insecticides: Furadan (carbofuran) 0.6 lb ai/A, May 16

Harvest: Aug 8

Experimental Design: Randomized complete block with two replications

Comments: Entries 162,165, 168, 171, 174, 177, 180, 183, 189, 192, and 195 are Louisiana entries. TeQing and Qui Chow are Chinese varieties with exceptional yield potential but extremely poor grain quality (Table 7).

TABLE 7. AGRONOMIC PERFORMANCE OF 1991 UNIFORM RICE NURSERY, GROUP VII. CROWLEY, LA.

1991 ENTRY	PEDIGREE	SEEDLING VIGOR*	DAYS TO 50% HEADING	HEIGHT (IN)	LODGING (%)	YIELD (LB/A)	DUNCAN'S TEST**	MILLING % (WHL-TOT)
TEQING	TQNG	5	89	46	45	8789	A	54-69
GUI CHOW	GCHW	6	92	46	50	8048	AB	61-70
168	MERC/RICO	5	81	41	20	7372	BC	66-71
192	RAX CLEAR	4	83	40	0	7065	BCD	62-69
195	LMNT/NWBT//80Y50	7	82	40	0	6909	BCDE	51-69
183	LMNT/MERC//MERC	5	81	39	0	6752	CDEF	67-71
166	8003050/CA82Y24/...	7	88	38	0	6720	CDEF	60-69
182	NWBT//LBNT/STBN	5	80	43	0	6653	CDEF	56-67
174	80Y50/LBLE//TBNT	5	80	43	5	6565	CDEFG	61-69
A-301	A301	6	84	41	0	6545	CDEFG	56-70
163	8303116/LMNT	6	83	41	5	6517	CDEFG	59-68
180	NWBT/LMNT//82CAY	6	79	37	10	6499	CDEFG	63-70
164	NWBT/3/DAWN/9695...	6	87	44	0	6490	CDEFG	60-69
170	NWBT/3/DAWN/9692...	6	89	44	0	6465	CDEFG	60-69
177	MARS/M201//MARS	4	83	40	0	6464	CDEFG	60-70
194	LBNT/BOND	6	85	46	0	6399	CDEFG	57-68
169	86-570/PCOS//GFMT...	6	57	38	5	6300	CDEFG	63-69
171	MERC/LMNT//MERC	5	81	39	10	6282	CDEFG	59-71
184	LBLE-X2/LMNT	7	84	38	0	6158	CDEFG	54-67
175	8003050/CA82Y24/...	7	90	37	0	6139	CDEFG	61-70
176	NWBT(20KR)	5	83	45	0	6130	CDEFG	59-67
185	LMNT//BN73*2/NV7...	6	87	40	0	6110	CDEFG	57-71
179	BN73*2/NV76//TBNT...	5	82	43	0	6090	CDEFG	57-69
193	LMNT/KATY	5	84	38	0	6041	DEFG	60-69
173	BP87/9902//LBNT/...	4	88	46	0	6017	DEFG	52-66
178	8303181/CB801	7	86	42	5	6006	DEFG	59-69
JASMINE 85	JSMN 85	5	99	46	20	5976	DEFG	56-66
191	BRAZ/LBLE	5	85	44	0	5901	DEFG	55-65
167	LMNT/RA73	6	85	41	5	5808	DEFG	59-68
165	L202//LMNT/LEAH	6	88	38	0	5730	EFG	54-65
187	8303116/CB801	7	85	39	0	5720	EFG	44-65
181	8303181/CB801	7	85	40	0	5718	EFG	54-69
186	LMNT/IRGA409	5	79	37	20	5696	EFG	57-67
162	L202/LMNT	5	82	41	5	5676	EFG	55-66
172	87-14693/GFMT	6	84	41	5	5597	FG	57-69
196	LEAH/8003050	7	90	37	0	5570	FG	44-71
161	L201//VSTA/79010	5	85	47	0	5551	FG	54-66
188	STBN/L110//L201	5	87	48	0	5525	FG	56-67
189	BP87/9902//2*LMNT...	7	89	35	0	5330	G	61-70
190	8303181/CB801	7	82	39	30	5297	G	57-67
C.V.		8.5	7.0	3.3	-	8.4		4.5-1.8

* SUBJECTIVE RATING 1 TO 9, WHERE 1 = EXCELLENT, 9 = POOR.
** NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

COMMERCIAL VARIETY TESTS

The Rice Breeding project annually conducts yield trials on commercial rice varieties. Included in the tests are the major commercial varieties and advanced experimentals in the final stages of testing before release from the cooperating public and private breeding programs.

These tests were conducted at three locations in Louisiana in 1991. These included the Rice Research Station, the Northeast Research Station at St. Joseph, and an on-farm location in East Carroll Parish. An additional on-farm location in Vermilion Parish was abandoned because a combination of weather related late planting and severe bird damage at seedings led to the potential of poor information. The East Carroll location was carried out in cooperation with the Rice Fertilization and Cultural Management project under the direction of Dr. Pat Bollich. The Northeast Research Station location was conducted cooperatively with Mr. Steve Crawford, Weed Scientist at that location.

These tests included the following entries:

Entry	Grain Type	Source
Very Early Group		
Alan	L	AAES, Stuttgart, AR
AR 1001	L	AAES, Stuttgart, AR
AS 3510	L	Alexandria Seed Company
Jackson	L	MAFES, Stoneville, MS
Labelle	L	TAES, USDA, Beaumont, TX
Maybelle	L	TAES, USDA, Beaumont, TX
Millie	L	AAES, Stuttgart, AR
RAX 2061	L	Ring Around Hybrid Seed Co., East Bernard, TX
Rosemont	L	TAES, USDA, Beaumont, TX
RT 7015	L	RiceTec Seed Company, Alvin, TX
Skybonnet	L	TAES, USDA, Beaumont, TX
Tebonnet	L	AAES, Stuttgart, AR
Texmont	L	TAES, USDA, Beaumont, TX
Early Group		
AS 3058	M	Alexandria Seed Company
Bengal	M	LAES, Crowley, LA
Cypress	L	"
Della	L (aromatic)	"
Gulfmont	L	TAES, USDA, Beaumont, TX

Continued.

Continued.

Entry	Grain Type	Source
Early Group (continued)		
Jasmine	L	TAES, USDA, Beaumont, TX
Katy	L	AAES, Stuttgart, AR
Lacassine	L	LAES, Crowley, LA
LA 2031	L	"
LA 2146	L	"
LA 2215	L (aromatic)	"
Lemont	L	TAES, USDA, Beaumont, TX
Mars	M	AAES, Stuttgart, AR
Mercury	M	LAES, Crowley, LA
Newbonnet	L	AAES, Stuttgart, AR
Orion	M	AAES, Stuttgart, AR
RAX 2222	L	Ring Around Hybrid Seed Co., East Bernard, TX
RAX 2224	L	Ring Around Hybrid Seed Co., East Bernard, TX
Rico 1	M	TAES, USDA, Beaumont, TX
Toro 2	L (low amylose)	LAES, Crowley, LA
TX 3069	M	TAES, USDA, Beaumont, TX
TX 3072	L	TAES, USDA, Beaumont, TX
V 4716	M	RiceTec Seed Company, Alvin, TX
V 7817	M	RiceTec Seed Company, Alvin, TX

<u>Experiment:</u> Commercial Variety Test - Very Early Group

<u>Location:</u> Rice Research Station

<u>Seeding Rate/Date:</u> 100 lb/A, Apr 3, 1991

<u>Planting Method:</u> Drill-seeded

<u>Fertilization:</u> 50-50-50 (lb/A N-P_2O_5-K_2O) preplant incorporated, Apr 2; 70 lb N/A, May 2 (preflood); 21 lb N/A, May 27; 74 lb N/A, Aug 1 (ratoon crop)

<u>Plot Size:</u> 4.66 x 16 ft (74.5 ft^2)

<u>Water Management:</u> Flushed, Apr 4; flooded, May 2; harvest drainage, July 16; reflooded, Aug 2; harvest drainage (second crop), Oct 6

<u>Herbicides:</u> Stam (propanil) 3.5 lb ai/A, May 1; Londax (bensulfuron-methyl) 1.0 oz ai/A, May 5

<u>Insecticides:</u> Furadan (carbofuran) 0.6 lb ai/A, May 16

<u>Harvest:</u> July 31; ratoon crop, Oct 14

<u>Experimental Design:</u> Randomized complete block with four replications

<u>Comments:</u> Yields and milling yields were low primarily due to rotten neck blast disease. Also, excessive rainfall at heading caused some sterility (Tables 8 and 9).

TABLE 8. AGRONOMIC PERFORMANCE OF 1991 COMMERCIAL VARIETY TESTS, VERY EARLY GROUP, CROWLEY, LA.

1991 ENTRY	GRAIN TYPE*	SEEDLING VIGOR**	DAYS TO 50% HEADING	HEIGHT (IN)	LODGING (%)	YIELD (LB/A @12%)	DUNCAN'S TEST***	MILLING (WHL-TOT)
RAX 2061	L	8	78	42	0	7759	A	58-71
MILLIE	L	6	82	41	0	6463	B	59-70
RT 7015	L	5	80	37	0	6199	BC	57-69
JACKSON	L	6	82	41	0	6106	BCD	57-67
TEBONNET	L	7	83	52	0	6105	BCD	59-69
ALAN	L	5	81	42	0	6097	BCD	56-67
MAYBELLE	L	5	75	36	0	5762	CDE	55-65
ROSEMONT	L	6	80	35	0	5557	CDE	55-68
AS 3510	L	7	70	44	0	5521	CDE	62-69
LABELLE	L	8	85	51	0	5416	DE	60-69
TEXMONT	L	8	82	34	0	5124	E	50-67
SKYBONNET	L	7	87	49	0	5094	E	58-68
AR 1001	L	7	69	37	0	3643	F	44-66
C.V.		11.4	1.6	3.4	-	7.4		4.9-2.3

* L = LONG GRAIN.

** SUBJECTIVE RATING 1 TO 9, WHERE 1 = EXCELLENT, 9 = POOR.

*** NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 9. YIELDS OF MAIN AND RATOON CROP OF 1991 COMMERCIAL VARIETIES, VERY EARLY GROUP. CROWLEY, LA.

1991 ENTRY	RATOON HEIGHT (IN)	MAIN CROP YIELD	RATOON CROP YIELD	TOTAL YIELD	DUNCANS TEST*
		LB/A @ 12% M			
RAX 2061	30	7759	2262	10021	A
MILLIE	33	6463	2599	9062	B
JACKSON	34	6106	2221	8327	C
RT 7015	30	6199	1921	8120	C
ALAN	34	6097	1884	7980	C
MAYBELLE	30	5762	2164	7926	C
ROSEMONT	31	5557	2166	7723	CD
TEXMONT	28	5124	2107	7231	DE
TEBONNET	36	6105	1118	7223	DE
LABELLE	37	5416	1426	6842	EF
AS 3510	33	5521	1006	6526	F
SKYBONNET	36	5094	1330	6424	F
9001001	25	3643	347	3990	G
C.V.	7.6	7.4	16.7	5.9	

* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

Experiment: Commercial Variety Test - Early Group

Location: Rice Research Station

Seeding Rate/Date: 100 lb/A, Apr 3, 1991

Planting Method: Drill-seeded

Fertilization: 50-50-50 (lb/A N-P_2O_5-K_2O) preplant incorporated, Apr 2; 70 lb N/A, May 2 (preflood); 21 lb N/A, May 27; 74 lb N/A, Aug 9 (ratoon crop)

Plot Size: 4.66 x 16 ft (74.5 ft^2)

Water Management: Flushed, Apr 4; flooded, May 2; harvest drainage, July 23; reflooded, Aug 9; harvest drainage (second crop), Oct 18

Herbicides: Stam (propanil) 3.5 lb ai/A, May 1; Londax (bensulfuron-methyl) 1.0 oz ai/A, May 5

Insecticides: Furadan (carbofuran) 0.6 lb ai/A, May 16

Harvest: Aug 8; second crop, Nov 4

Experimental Design: Randomized complete block with four replications

Comments: Grain and milling yields were reduced due to rotten neck blast in the first crop. Ratoon crop yields were good (Tables 10 and 11).

TABLE 10. AGRONOMIC PERFORMANCE OF 1991 COMMERCIAL VARIETY TESTS, EARLY GROUP, CROWLEY, LA.

1991 ENTRY	GRAIN TYPE*	SEEDLING VIGOR**	DAYS TO 50% HEADING	HEIGHT (IN)	LODGING (%)	YIELD (LB/A @12%)	DUNCAN'S TEST***	MILLING (WHL-TOT)
RAX 2222	L	7	97	41	0	7458	A	61-70
RICO 1	M	7	89	45	0	7390	A	63-69
RAX 2224	L	7	87	41	0	7382	A	49-71
TX 3069	M	6	88	44	0	7325	A	64-70
LA 2031	L	5	81	39	0	7180	A	60-70
MERCURY	M	5	85	39	0	6622	B	62-70
JASMINE	L	6	101	46	0	6595	B	54-64
CYPRESS	L	5	87	40	0	6525	BC	62-69
MARS	M	5	87	47	0	6453	BCD	63-69
BENGAL	M	5	88	39	0	6381	BCDE	63-69
ORION	M	5	86	44	0	6355	BCDEF	65-70
TX 3072	L	7	87	37	0	6164	BCDEFG	55-69
AS 3058	M	6	83	44	0	6040	CDEFG	62-69
LACASSINE	L	5	86	38	0	6024	CDEFG	56-69
TORO 2	L	7	89	44	0	6013	CDEFGH	62-71
LEMONT	L	7	92	38	0	5931	DEFGH	57-71
KATY	L	5	87	46	0	5861	EFGH	63-69
GULFMONT	L	6	90	38	0	5848	EFGH	58-71
V 4716	M	6	86	39	0	5841	FGH	68-72
LA 2215	L	7	86	37	0	5660	GH	51-71
LA 2146	L	6	89	46	0	5645	GH	56-66
V 7817	L	9	97	36	0	5487	HI	56-67
NEWBONNET	L	5	89	46	0	5072	IJ	54-66
DELLA	L	7	90	56	0	4863	J	56-68
C.V.		10.5	1.1	2.7	-	5.2		4.4-0.8

* L = LONG GRAIN, M = MEDIUM GRAIN.

** SUBJECTIVE RATING 1 TO 9, WHERE 1 = EXCELLENT, 9 = POOR.

*** NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 11. YIELDS OF MAIN AND RATOON CROP OF COMMERCIAL VARIETY TEST, EARLY GROUP, CROWLEY, LA.

1991 ENTRY	RATOON HEIGHT (IN)	MAIN CROP YIELD	RATOON CROP YIELD	TOTAL YIELD	DUNCANS TEST*
		LB/A @ 12% M			
LA 2031	29	7180	2899	10079	A
RAX 2224	27	7382	2447	9829	AB
JASMINE	30	6595	2878	9473	BC
RAX 2222	28	7458	1747	9205	CD
CYPRESS	29	6525	2158	8683	DE
MERCURY	32	6622	1954	8575	EF
TX 3072	27	6164	2387	8550	EF
TX 3069	29	7325	1199	8524	EFG
RICO 1	29	7390	1105	8495	EFG
AS 3058	34	6040	2185	8225	EFGH
BENGAL	31	6381	1832	8212	EFGH
V 4716	29	5841	2279	8120	EFGH
TORO 2	30	6013	2026	8038	FGHI
V 7817	26	5487	2525	8012	FGHIJ
MARS	33	6453	1445	7898	GHIJ
LACASSINE	30	6024	1832	7855	HIJ
LA 2215	29	5660	2188	7848	HIJ
ORION	29	6355	1493	7848	HIJ
LA 2146	32	5645	2061	7706	HIJK
LEMONT	30	5931	1752	7683	HIJK
GULFMONT	28	5848	1621	7469	IJK
KATY	32	5861	1526	7387	JK
NEWBONNET	31	5072	2063	7135	K
DELLA	36	4863	1177	6040	L
C.V.	4.2	5.2	11.8	4.7	

* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

Experiment: Commercial Variety Test - Very Early and Early Groups

Location: East Carroll Parish

Seeding Rate/Date: 100 lb/A, May 24, 1991

Planting Method: Drill-seeded

Fertilization: 120 lb N/A, June 25

Plot Size: 7 x 25 ft (175 ft^2)

Water Management: Flushed, May 27, June 5, June 17; flooded, June 26; harvest drainage, Sept 10

Herbicides: Stam (propanil) 3.0 lb ai/A + Bolero (thiobencarb) 2.0 lb ai/A, June 15; Stam (propanil) 4.0 lb ai/A, June 22; Londax (bensulfuron-methyl) 0.9 oz ai/A, July 23; Ordram (molinate) 4.0 lb ai/A, July 8

Insecticides: Furadan (carbofuran) 0.6 lb ai/A, July 18; Methyl parathion 0.25 lb ai/A, Aug 26

Fungicides: Benlate (benomyl) 0.75 lb ai/A, Aug 7, Aug 26

Harvest: Sept 30

Experimental Design: Randomized complete block with four replications

Comments: Grain and milling yields were excellent for most entries (very early group, Table 12; Early group, Table 13).

TABLE 12. AGRONOMIC PERFORMANCE OF 1991 COMMERCIAL VARIETY TESTS, VERY EARLY GROUP, EAST CARROLL PARISH, LA.

1991 ENTRY	GRAIN TYPE*	DAYS TO 50% HEADING	HEIGHT (IN)	LODGING (%)	YIELD (LB/A @12%)	DUNCAN'S TEST**	MILLING (WHL-TOT)
RAX 2061	L	78	46	0	9355	A	58-72
ALAN	L	83	43	0	8482	B	63-71
ROSEMONT	L	83	36	0	8478	B	64-72
TEBONNET	L	84	50	0	8131	BC	65-72
SKYBONNET	L	89	48	0	7960	BCD	68-73
TEXMONT	L	82	35	0	7601	CDE	61-74
JACKSON	L	86	40	0	7359	DE	63-72
MILLIE	L	84	42	0	7196	E	69-74
LABELLE	L	83	49	0	7092	E	68-73
RT 7015	L	83	36	0	7053	E	65-72
MAYBELLE	L	77	37	0	6417	F	55-74
AR 1001	L	67	33	0	3243	G	43-67
AS 3510	L	67	37	0	2297	H	51-68
C.V.		0.9	5.1	-	6.1		3.5-1.6

* L = LONG GRAIN.

** NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 13. AGRONOMIC PERFORMANCE OF 1991 COMMERCIAL VARIETY TESTS, EARLY GROUP, EAST CARROLL PARISH, LA.

1991 ENTRY	GRAIN TYPE*	DAYS TO 50% HEADING	HEIGHT (IN)	LODGING (%)	YIELD (LB/A @12%)	DUNCAN'S TEST**	MILLING (WHL-TOT)
RICO 1	M	87	43	0	10298	A	65-70
TX 3069	M	84	44	0	10274	A	67-70
BENGAL	M	85	38	0	9597	B	67-71
RAX 2224	L	82	40	0	8737	C	60-73
MARS	M	86	46	0	8701	CD	68-72
LA 2146	L	89	43	0	8440	CDE	64-70
TX 3072	L	90	37	0	8411	CDEF	64-72
JASMINE	L	96	46	0	8268	CDEFG	53-65
MERCURY	M	84	38	0	8259	CDEFG	71-73
ORION	M	83	41	0	8167	CDEFGH	65-72
CYPRESS	L	92	40	0	8123	CDEFGH	64-70
NEWBONNET	L	92	45	0	8097	CDEFGH	66-70
TORO 2	L	88	44	0	8045	CDEFGH	69-74
LACASSINE	L	92	37	0	8004	DEFGH	63-72
RAX 2222	L	93	42	0	7957	EFGH	54-68
GULFMONT	L	93	36	0	7812	EFGHI	67-73
LA 2031	L	87	38	0	7801	EFGHI	60-70
AS 3058	M	83	44	0	7686	FGHIJ	68-71
LEMONT	L	94	36	0	7625	GHIJ	66-72
V 4716	M	86	37	0	7444	HIJK	72-73
LA 215	L	87	36	0	7122	IJKL	64-73
V 7817	L	94	35	0	7098	JKL	62-70
KATY	L	93	46	0	6898	KL	62-69
DELLA	L	88	49	0	6745	L	59-70
C.V.		1.4	2.7	-	5.3		4.0-2.0

* L = LONG GRAIN, M = MEDIUM GRAIN.

** NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

Experiment: Commercial Variety Test - Very Early Group

Location: Northeast Research Station, St. Joseph

Seeding Rate/Date: 100 lb/A, May 28, 1991

Planting Method: Drill-seeded

Fertilization: 60-60-60 (lb/A N-P_2O_5-K_2O) preplant incorporated, May 28;
90 lb N/A, June 20

Plot Size: 7x 12 ft (56 ft^2)

Water Management: Flooded, June 20; harvest drainage, Sept 1

Herbicides: Stam (propanil) 3.0 lb ai/A + Facet (quinclorac) 0.25 lb ai/A, June 15

Harvest: Sept 18

Experimental Design: Randomized complete block with four replications

Comments: Growing conditions were generally excellent contributing to very good yields. Some bird damage in entries AR 1001 and AS 3510 probably reduced yields (Table 14).

TABLE 14. AGRONOMIC PERFORMANCE OF 1991 COMMERCIAL VARIETY TESTS, VERY EARLY GROUP, ST JOSEPH, LA.

1991 ENTRY	GRAIN TYPE*	DAYS TO 50% HEADING	HEIGHT (IN)	LODGING (%)	YIELD (LB/A @12%)	DUNCAN'S TEST**
ALAN	L	77	44	0	8460	A
RAX 2061	L	77	44	0	8455	A
JACKSON	L	80	45	0	8076	AB
TEBONNET	L	71	54	0	7771	BC
RT 7015	L	75	39	0	7722	BC
MILLIE	L	73	44	0	7666	BC
SKYBONNET	L	76	49	0	7450	BC
LABELLE	L	77	53	0	7337	C
MAYBELLE	L	74	42	0	7320	C
ROSEMONT	L	77	39	0	7189	C
TEXMONT	L	80	37	0	7115	C
AR 1001	L	72	40	0	5955	D
AS 3510	L	65	43	0	4422	E
C.V.		7.5	3.0	-	5.6	

* L = LONG GRAIN.

** NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

Experiment: Commercial Variety Test - Early Group

Location: Northeast Research Station, St. Joseph

Seeding Rate/Date: 100 lb/A, May 28, 1991

Planting Method: Drill-seeded

Fertilization: 60-60-60 (lb/A N-P_2O_5-K_2O) preplant incorporated, May 28;
90 lb N/A, June 20

Plot Size: 4.66 x 16 ft (74.5 ft^2)

Water Management: Flooded, June 20; harvest drainage, Sept 8

Herbicides: Stam (propanil) 3.0 lb ai/A + Facet (quinclorac) 0.25 lb ai/A, June 15

Harvest: Sept 28

Experimental Design: Randomized complete block with four replications

Comments: Poor emergence in some entries led to thin stands and some unevenness at maturity. Overall, yields were somewhat lower than in the very early group (Table 15).

TABLE 15. AGRONOMIC PERFORMANCE OF 1991 COMMERCIAL VARIETY TESTS, EARLY GROUP, ST JOSEPH, LA.

1991 ENTRY	GRAIN TYPE*	DAYS TO 50% HEADING	HEIGHT (IN)	LODGING (%)	YIELD (LB/A @12%)	DUNCAN'S TEST**
RICO 1	M	85	45	0	8730	A
JASMINE	L	92	46	0	8154	AB
RAX 2222	L	92	41	0	8061	ABC
TX 3069	M	86	44	0	8032	ABC
MARS	M	86	47	0	7492	BCD
LA 2146	L	88	46	0	7447	BCD
NEWBONNET	L	88	47	0	7341	BCD
BENGAL	M	83	39	0	7227	CD
LA 2031	L	86	41	0	7160	CDE
MERCURY	M	85	40	0	7111	DEF
RAX 2224	L	83	39	0	7071	DEF
ORION	M	88	44	0	7068	DEF
V 4716	M	83	38	0	6969	DEFG
AS 3058	M	83	46	0	6947	DEFG
CYPRESS	L	91	41	0	6938	DEFG
TX 3072	L	91	37	0	6857	DEFG
KATY	L	94	48	0	6621	DEFGH
LEMONT	L	92	39	0	6607	DEFGH
LACASSINE	L	89	37	0	6563	DEFGH
LA 2215	L	89	38	0	6212	EFGHI
TORO 2	L	87	44	0	6203	FGHI
V 7817	L	93	36	0	6072	HI
GULFMONT	L	92	38	0	5812	HI
DELLA	L	85	53	0	5386	I
C.V.		3.2	–	8.1		

* L = LONG GRAIN, M = MEDIUM GRAIN.

** NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

Combined analyses: Three-location means for the commercial variety tests are presented in Tables 16 and 17. The means for milling are for two locations (Rice Research Station and East Carroll Parish).

TABLE 16. AGRONOMIC PERFORMANCE OF 1991 COMMERCIAL VARIETY TESTS, VERY EARLY GROUP, THREE LOCATION MEANS, LA.

1991 ENTRY	GRAIN TYPE*	SEEDLING VIGOR**	DAYS TO 50% HEADING	HEIGHT (IN)	LODGING (%)	YIELD (LB/A @12%)	DUNCAN'S TEST***	MILLING (WHL-TOT)
RAX 2061	L	8	77	44	0	8523	A	58-71
ALAN	L	5	80	43	0	7680	B	59-69
TEBONNET	L	7	80	52	0	7336	BC	62-71
JACKSON	L	6	83	42	0	7180	BCD	60-70
MILLIE	L	6	79	42	0	7108	BCD	64-72
ROSEMONT	L	6	80	36	0	7074	BCD	59-70
RT 7015	L	5	80	37	0	6991	BCD	61-70
SKYBONNET	L	7	85	49	0	6834	CD	63-70
LABELLE	L	8	82	51	0	6615	CD	64-71
TEXMONT	L	8	81	36	0	6613	CD	55-71
MAYBELLE	L	5	75	38	0	6499	D	55-69
AR 1001	L	7	69	37	0	4280	E	43-67
AS 3510	L	7	67	41	0	4080	E	57-69
C.V.		11.3	4.7	5.0	-	12.6		6.6-2.5

* L = LONG GRAIN, M = MEDIUM GRAIN, S = SHORT, I = INTERMEDIATE.
** SUBJECTIVE RATING 1 TO 9, WHERE 1 = EXCELLENT, 9 = POOR.
*** NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 17. AGRONOMIC PERFORMANCE OF 1991 COMMERCIAL VARIETY TESTS, EARLY GROUP THREE LOCATION MEANS, LA.

1991 ENTRY	GRAIN TYPE*	SEEDLING VIGOR**	DAYS TO 50% HEADING	HEIGHT (IN)	LODGING (%)	YIELD (LB/A @12%)	DUNCAN'S TEST***	MILLING (WHL-TOT)
RICO 1	M	7	88	44	0	8806	A	64-69
TX 3069	M	6	86	44	0	8544	A	65-70
RAX 2222	L	7	95	42	0	7825	B	58-69
BENGAL	M	5	86	39	0	7735	B	65-70
RAX 2224	L	7	84	40	0	7730	B	54-72
JASMINE	L	6	98	46	0	7672	BC	53-65
MARS	M	5	87	47	0	7549	BC	66-70
LA 2031	L	5	84	39	0	7380	BCD	60-70
MERCURY	M	5	85	39	0	7331	BCDE	67-71
ORION	M	5	85	43	0	7197	CDEF	65-71
CYPRESS	L	5	89	40	0	7195	CDEF	63-69
LA 2146	L	6	89	45	0	7178	CDEF	60-68
TX 3072	L	7	89	37	0	7144	CDEF	59-71
AS 3058	M	6	83	45	0	6891	DEFG	65-70
LACASSINE	L	5	89	37	0	6863	DEFGH	60-70
NEWBONNET	L	5	90	46	0	6837	EFGH	60-68
TORO 2	L	7	88	44	0	6753	FGH	66-72
V 4716	M	6	85	38	0	6752	FGH	70-73
LEMONT	L	7	93	38	0	6721	FGHI	62-71
GULFMONT	L	6	92	37	0	6490	GHI	62-72
KATY	L	5	90	47	0	6460	GHI	62-69
LA 2215	L	7	87	37	0	6331	HI	58-72
V 7817	L	9	95	35	0	6219	I	59-68
DELLA	L	7	89	52	0	5665	J	58-69
C.V.		10.5	2.6	3.2	-	7.9		5.6-1.9

* L = LONG GRAIN, M = MEDIUM GRAIN.

** SUBJECTIVE RATING 1 TO 9, WHERE 1 = EXCELLENT, 9 = POOR.

*** NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

ADVANCED YIELD TESTS

The Rice Breeding project annually conducts on-farm testing of advanced experimental lines to complement tests conducted on station. The goal of these activities are to sample additional environments in yield testing of new promising selections from the breeding program. These additional yield evaluations are needed to identify the performance characteristics, strengths, and weaknesses of the test entries. Multi-location and multi-year testing are essential to provide the information needed to make decisions relative to the release of new varieties.

Advanced yield tests were conducted at the Rice Research Station and at four other locations in 1991 in cooperation with commercial growers and the Rice Research Station Fertilization and Cultural Management project. Twenty-four experimentals and six checks were included in the 1991 testing program. Ratoon crop information was generated at the Rice Research Station and at the Vermilion Parish location.

Experiment: Advanced Yield Test

Location: Rice Research Station

Seeding Rate/Date: 100 lb/A, Apr 3, 1991

Planting Method: Drill-seeded

Fertilization: 50-50-50 (lb/A N-P_2O_5-K_2O) preplant incorporated, Apr 2; 70 lb N/A, May 2; 21 lb N/A, May 27; 74 lb N/A, Aug 9 (ratoon crop)

Plot Size: 4.66 x 25 ft (116.5 ft^2)

Water Management: Flushed, Apr 4; flooded, May 2; harvest drainage, July 23; ratoon crop flooded, Aug 9; harvest drainage second crop, Oct 6

Herbicides: Stam (propanil) 3.5 lb ai/A, May 1;
Londax (bensulfuron-methyl) 0.9 oz ai/A, May 5

Insecticides: Furadan (carbofuran) 0.6 lb ai/A, May 16

Harvest: First crop, Aug 8; ratoon crop, Nov 5

Experimental Design: Randomized complete block with four replications

Comments: First crop yields were good to moderate with some yield reduction caused by rotten neck blast and sheath blight. Ratoon crop yields were generally good (Tables 18 and 19).

TABLE 18. AGRONOMIC PERFORMANCE OF 1991 ADVANCED YIELD TEST, CROWLEY, LA.

1991 ENTRY	PEDIGREE	SEEDLING VIGOR*	DAYS TO 50% HEADING	HEIGHT (IN)	LODGING (%)	YIELD (LB/A)	DUNCAN'S TEST**	MILLING % (WHL-TOT)
RICO 1	RICO	6	88	45	0	7584	A	63-71
218	RX CL	6	93	38	0	7324	A	61-68
202	LMNT/NWBT/3/L202...	6	81	39	0	6739	B	58-71
204	L202/LMNT	6	82	37	0	6682	BC	59-70
223	MERC/RICO	6	83	41	0	6621	BCD	67-73
ORION	ORIN	5	85	42	0	6568	BCDE	64-71
205	M101/MARS/3/NTAI...	5	84	37	0	6564	BCDE	60-71
208	SMARS/MARS//MARS	4	88	38	0	6563	BCDE	64-69
206	NWBT/LMNT//TBNT	7	88	38	0	6512	BCDE	58-71
BENGAL	BNGL	5	86	38	0	6429	BCDEF	64-72
MARS	MARS	5	86	47	0	6349	BCDEFG	62-70
220	LMNT//L202/CICA8	6	88	37	0	6340	BCDEFG	51-67
221	M101/MARS/3/NTAI	5	85	37	0	6325	BCDEFG	63-72
211	SMARS/MARS//MARS	4	89	38	0	6297	BCDEFGH	65-70
203	L202/LMNT	6	86	37	0	6255	CDEFGH	61-72
CYPRESS	CPRS	5	85	38	0	6236	CDEFGHI	62-70
213	L202/TBNT	5	84	39	0	6235	CDEFGHI	57-70
219	L202/TBNT	7	75	38	0	6213	DEFGHIJ	64-73
212	M201/3/5442/UNK/...	6	79	36	0	6166	EFGHIJ	62-70
216	MERC/LMNT//MERC	6	85	38	0	5993	FGHIJK	58-71
222	LMNT/DLLA	6	87	40	0	5966	GHIJKL	63-72
201	LMNT//L202/TDCN	6	87	37	0	5951	GHIJKL	57-72
210	LMNT/DLLA	7	84	38	0	5871	HIJKL	61-73
LACASSINE	LCSN	5	86	37	0	5805	IJKL	56-72
KATY	KATY	6	88	46	0	5786	JKLM	52-67
224	LMNT/MERC//MERC	5	86	39	0	5637	KLM	65-71
ROSEMONT	RSMT	6	80	36	0	5582	KLM	54-69
215	LMNT/DLLA	8	86	38	0	5549	LM	50-71
209	8002610/CICA9	7	90	45	0	5379	M	55-67
217	LBLE-SC-5	7	91	41	0	4801	N	53-65
C.V.		15.9	1.5	2.5	-	4.3		4.0-1.3

* SUBJECTIVE RATING 1 TO 9, WHERE 1 = EXCELLENT, 9 = POOR.
** NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 19. YIELDS OF MAIN AND RATOON CROP OF 1991 ADVANCED YIELD TEST. CROWLEY, LA.

1991 ENTRY	PEDIGREE	RATOON HEIGHT (IN)	MAIN CROP YIELD	RATOON CROP YIELD	TOTAL YIELD	DUNCANS TEST*
			LB/A @ 12% M			
218	RX CL	29	7324	2450	9774	A
204	L202/LMNT	31	6682	2693	9375	AB
RICO 1	RICO	29	7584	1718	9302	ABC
203	L202/LMNT	28	6255	3038	9293	ABC
202	LMNT/NWBT/3/L202...	31	6739	2402	9141	BCD
222	LMNT/DLLA	32	5966	2853	8818	CDE
BENGAL	BNGL	30	6429	2245	8674	DEF
223	MERC/RICO	31	6621	2019	8640	DEFG
205	M101/MARS/3/NTAI...	30	6564	2025	8590	EFGH
221	M101/MARS/3/NTAI...	29	6325	2253	8577	EFGH
219	L202/TBNT	29	6213	2359	8573	EFGH
CYPRESS	CPRS	31	6236	2280	8516	EFGH
213	L202/TBNT	30	6235	2279	8514	EFGH
216	MERC/LMNT//MERC	29	5993	2451	8444	EFGH
220	LMNT//L202/CICA8	31	6340	2004	8344	EFGH
201	LMNT//L202/TDCN	28	5951	2329	8280	EFGHI
212	M201/3/5442/UNK/...	28	6166	2101	8267	EFGHI
ORION	ORIN	29	6568	1655	8223	FGHIJ
215	LMNT/DLLA	31	5549	2609	8158	FGHIJK
MARS	MARS	34	6349	1797	8145	FGHIJK
KATY	KATY	33	5786	2289	8075	GHIJK
208	SMARS/MARS//MARS	29	6563	1501	8064	GHIJK
210	LMNT/DLLA	30	5871	2155	8027	HIJK
ROSEMONT	RSMT	29	5582	2439	8021	HIJK
206	NWBT/LMNT//TBNT	28	6512	1496	8009	HIJK
211	SMARS/MARS//MARS	29	6297	1700	7997	HIJK
209	8002610/CICA9	31	5379	2361	7740	IJK
217	LBLE-SC-5	33	4801	2918	7719	IJK
224	LMNT/MERC//MERC	32	5637	2007	7644	JK
LACASSINE	LCSN	29	5805	1773	7578	K
C.V.		4.5	4.3	10.6	4.1	

* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

Experiment: Advanced Yield Test

Location: Rapides Parish, Will Bollich Farm

Seeding Rate/Date: 100 lb/A, Apr 10, 1991

Planting Method: Drill-seeded

Fertilization: 120 lb N/A, May 14

Plot Size: 7 x 25 ft (175 ft^2)

Water Management: Flooded, May 15; harvest drainage, Aug 1

Herbicides: Stam (propanil) 3.0 lb ai/A + Bolero (thiobencarb) 3.0 lb ai/A, May 13;
Londax (bensulfuron-methyl) 0.9 oz ai/A, June 4;
Ordram (molinate) 3.0 lb ai/A, June 4

Insecticides: Furadan (carbofuran) 0.6 lb ai/A, June 8

Fungicides: Benlate (benomyl) 0.75 lb ai/A, July 13

Harvest: Aug 20

Experimental Design: Randomized complete block with four replications

Comments: Grain yields were moderate while milling yields were good to excellent (Table 20).

TABLE 20. AGRONOMIC PERFORMANCE OF 1991 ADVANCED YIELD TEST, RAPIDES PARISH, LA.

1991 ENTRY	PEDIGREE	SEEDLING VIGOR*	DAYS TO 50% HEADING	HEIGHT (IN)	LODGING (%)	YIELD (LB/A)	DUNCAN'S TEST**	MILLING % (WHL-TOT)
218	RX CL	6	95	37	0	7767	A	63-70
RICO 1	RICO	6	93	38	0	7022	B	64-72
204	L202/LMNT	6	91	37	0	6965	BC	63-71
ROSEMONT	RSMT	5	88	34	0	6782	BCD	50-71
BENGAL	BNGL	6	91	36	0	6695	BCD	64-73
211	SMARS/MARS//MARS	5	92	33	0	6672	BCD	65-71
MARS	MARS	6	90	40	0	6601	BCDE	63-71
213	L202/TBNT	5	91	40	0	6395	BCDEF	59-70
ORION	ORIN	5	89	37	0	6358	BCDEF	62-71
220	LMNT//L202/CICA8	5	94	36	0	6340	BCDEF	56-70
206	NWBT/LMNT//TBNT	6	95	36	0	6325	BCDEF	63-72
212	M201/3/5442/UNK/...	7	88	32	0	6131	CDEFG	67-72
205	M101/MARS/3/NTAI...	5	89	35	0	6056	DEFGH	65-72
LACASSINE	LCSN	6	94	34	0	6025	DEFGH	65-73
CYPRESS	CPRS/LMNT	5	92	35	0	6017	DEFGH	65-73
207	L202/LMNT	5	94	35	0	5989	DEFGH	65-71
221	M101/MARS/3/NTAI	5	90	35	0	5935	DEFGH	62-71
223	MERC/RICO	6	89	36	0	5932	DEFGH	68-73
209	8002610/CICA9	6	93	40	0	5924	DEFGH	63-70
210	LMNT/DLLA	6	94	36	0	5784	EFGHI	62-73
224	LMNT/MERC//MERC	5	90	34	0	5753	EFGHI	61-72
222	LMNT/DLLA	6	94	36	0	5620	FGHI	64-71
208	SMARS/MARS//MARS	5	91	33	0	5596	FGHI	63-71
216	MERC/LMNT//MERC	6	92	33	0	5342	GHIJ	57-71
201	LMNT//L202/TDCN	5	95	34	0	5339	GHIJ	63-72
219	L202/TBNT	6	80	34	0	5309	GHIJ	61-72
215	LMNT/DLLA	7	95	33	0	5227	HIJ	63-73
202	LMNT/NWBT/3/L202...	5	90	37	0	5064	IJ	56-71
KATY	KATY	4	94	40	0	5024	IJ	62-70
217	LBLE-SC-5	7	95	37	0	4704	J	60-68
C.V.		11.9	1.7	3.7	-	7.3		5.8-0.8

* SUBJECTIVE RATING 1 TO 9, WHERE 1 = EXCELLENT, 9 = POOR.
** NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

Experiment: Advanced Yield Test

Location: East Carroll Parish, Buford Perry Farm

Seeding Rate/Date: 100 lb/A, May 24, 1991

Planting Method: Drill-seeded

Fertilization: 120 lb N/A, June 25

Plot Size: 7 x 25 ft (175 ft^2)

Water Management: Flushed, May 27, June 5, June 17; flooded, June 26; harvest drainage, Sept 10

Herbicides: Stam (propanil) 3.0 lb ai/A + Bolero (thiobencarb) 2.0 lb ai/A, June 15; Stam (propanil), 4.0 lb ai/A, June 25; Londax (bensulfuron-methyl) 0.9 oz ai/A, July 23; Ordram (molinate) 4.0 lb ai/A, July 8

Insecticides: Furadan (carbofuran) 0.6 lb ai/A, July 18;
Methyl parathion 0.25 lb ai/A, Aug 26

Fungicides: Benlate (benomyl) 0.75 lb ai/A, Aug 7 and Aug 26

Harvest: Sept 30

Experimental Design: Randomized complete block with four replications

Comments: Grain and millings yields were excellent for most entries (Table 21).

TABLE 21. AGRONOMIC PERFORMANCE OF 1991 ADVANCED YIELD TEST, EAST CARROLL PARISH, LA.

1991 ENTRY	PEDIGREE	SEEDLING VIGOR*	DAYS TO 50% HEADING	HEIGHT (IN)	LODGING (%)	YIELD (LB/A)	DUNCAN'S TEST**	MILLING % (WHL-TOT)
218	RX CL	4	85	39	0	10835	A	61-69
RICO 1	RICO	5	87	43	0	9851	B	65-70
BENGAL	BNGL	4	84	38	0	9315	BC	67-71
MARS	MARS	3	86	46	0	8701	CD	68-72
220	LMNT//L202/CICA8	5	89	38	0	8638	CDE	58-70
208	SMARS/MARS//MARS	4	87	35	0	8526	DEF	68-71
209	8002610/CICA9	5	89	43	0	8440	DEFG	64-70
206	NWBT/LMNT//TBNT	6	89	38	0	8185	DEFGH	63-73
ORION	ORIN	4	83	41	0	8167	DEFGH	65-72
CYPRESS	CPRS	4	92	40	0	8123	DEFGH	64-70
211	SMARS/MARS//MARS	4	87	35	0	8110	DEFGH	69-72
LACASSINE	LCSN	6	92	37	0	8004	DEFGHI	63-72
204	L202/LMNT	4	87	38	0	7920	DEFGHIJ	60-70
ROSEMONT	RSMT	4	83	34	0	7824	EFGHIJK	59-73
223	MERC/RICO	5	83	42	0	7806	EFGHIJKL	70-74
224	LMNT/MERC//MERC	5	87	39	0	7772	FGHIJKL	68-73
205	M101/MARS/3/NTAI...	4	85	36	0	7714	FGHIJKLM	64-72
221	M101/MARS/3/NTAI...	4	85	36	0	7671	GHIJKLM	65-73
213	L202/TBNT	4	87	40	0	7663	GHIJKLM	57-72
203	L202/LMNT	5	88	35	0	7645	GHIJKLM	63-73
201	LMNT//L202/TDCN	6	91	38	0	7528	HIJKLMN	65-73
202	LMNT/NWBT/3/L202...	4	83	39	0	7415	HIJKLMN	64-73
222	LMNT/DLLA	6	87	37	0	7166	IJKLMNO	68-73
215	LMNT/DLLA	6	87	36	0	7122	JKLMNO	64-73
210	LMNT/DLLA	5	85	33	0	7084	JKLMNO	67-74
219	L202/TBNT	5	73	37	0	7063	KLMNO	66-73
217	LBLE-SC-5	5	91	41	0	6967	LMNO	62-67
KATY	KATY	4	93	46	0	6898	MNO	62-69
216	MERC/LMNT//MERC	6	86	36	0	6736	NO	67-73
212	M201/3/5442/UNK/...	5	77	35	0	6578	O	66-71
C.V.		9.8	1.2	3.4	-	6.3		3.6-1.6

* SUBJECTIVE RATING 1 TO 9, WHERE 1 = EXCELLENT, 9 = POOR.

** NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

Experiment: Advanced Yield Test

Location: Morehouse Parish, Edmond and Kirk Zaunbrecher Farm

Seeding Rate/Date: 150 lb/A, June 6, 1991

Planting Method: Water-seeded (pre-germinated seed)

Fertilization: 120 lb N/A preplant incorporated, June 5

Plot Size: 7 x 25 ft (175 ft^2)

Water Management: Flooded, June 6; drained, June 7; flooded, June 13; drained, 18; flooded, June 22; harvest drainage, Sept 16

Herbicides: Stam (propanil) 4.0 lb ai/A, June 21; Londax (bensulfuron-methyl) 0.9 oz ai/A, June 24; Ordram (molinate) 3.0 lb ai/A, July 5

Insecticides: Furadan (carbofuran) 0.6 lb ai/A, July 5; Methyl parathion 0.25 lb ai/A, Aug 24

Fungicides: Benlate (benomyl) 0.75 lb ai/A, Aug 6 and Aug 26

Harvest: Oct 2

Experimental Design: Randomized complete block with four replications

Comments: Most medium-grain and some long-grain entries were lodged at harvest maturity. However, grain and milling yields were generally very high (Table 22).

TABLE 22. AGRONOMIC PERFORMANCE OF 1991 ADVANCED YIELD TEST, MOREHOUSE PARISH, LA.

1991 ENTRY	PEDIGREE	DAYS TO 50% HEADING	HEIGHT (IN)	LODGING (%)	YIELD (LB/A)	DUNCAN'S TEST*	MILLING % (WHL-TOT)
RICO 1	RICO	78	44	90	10105	A	65-71
218	RX CL	74	35	33	9374	AB	59-71
BENGAL	BNGL	76	37	25	9022	BC	64-72
220	LMNT//L202/CICA8	79	37	8	9015	BC	59-70
204	L202/LMNT	75	39	15	8931	BCD	64-72
211	SMARS/MARS//MARS	78	37	28	8884	BCDE	66-71
206	NWBT/LMNT//TBNT	77	37	53	8776	BCDEF	64-71
223	MERC/RICO	75	41	80	8772	BCDEF	70-74
ROSEMONT	RSMT	72	36	10	8612	BCDEF	63-73
213	L202/TBNT	77	40	0	8577	BCDEFG	60-71
MARS	MARS	76	45	90	8576	BCDEFG	66-71
210	LMNT/DLLA	78	40	10	8552	BCDEFG	62-71
LACASSINE	LCSN	80	37	0	8502	BCDEFG	65-72
202	LMNT/NWBT/3/L202...	71	38	0	8489	BCDEFG	61-73
201	LMNT//L202/TDCN	77	37	0	8483	BCDEFG	66-73
209	8002610/CICA9	80	43	0	8411	CDEFG	63-71
208	SMARS/MARS//MARS	78	36	25	8390	CDEFG	66-70
219	L202/TBNT	67	37	0	8298	CDEFG	65-74
ORION	ORIN	75	41	90	8227	CDEFGH	66-71
212	M201/3/5442/UNK/...	69	36	63	8226	DEFGH	65-71
221	M101/MARS/3/NTAI...	75	35	55	8087	DEFGH	67-73
224	LMNT/MERC//MERC	76	38	78	8063	DEFGH	67-73
KATY	KATY	78	43	83	7976	EFGH	65-72
CYPRESS	CPRS	80	39	3	7910	FGH	65-72
222	LMNT/DLLA	78	41	33	7886	FGH	68-74
216	MERC/LMNT//MERC	76	38	15	7848	FGH	67-72
205	M101/MARS/3/NTAI...	76	37	38	7674	GH	68-73
203	L202/LMNT	78	37	0	7598	H	64-74
215	LMNT/DLLA	78	37	28	7358	HI	65-73
217	LBLE-SC-5	83	42	0	6786	I	58-67
C.V.		2.6	3.9	-	6.7		3.6-1.5

* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

Experiment: Advanced Yield Test

Location: Vermilion Parish, Errol Lounsberry Farm

Seeding Rate/Date: 150 lb/A, Mar 27, 1991

Planting Method: Water-seeded

Fertilization: 90-60-60 (lb/A N-P_2O_5-K_2O), Mar 25; 75 lb N/A, Aug 2

Plot Size: 7 x 25 ft (175 ft^2)

Water Management: Flooded, Mar 26; drained, Mar 29; reflooded, Apr 1; harvest drainage, July 15; second crop flooded, Aug 3; second crop harvest drainage, Oct 5

Herbicides: Ordram (molinate) 3.5 lb ai/A, Apr 16;
Londax (bensulfuron-methyl) 1 oz ai/A, Apr 17

Insecticides: Furadan (carbofuran) 0.6 lb ai/A, May 3

Fungicides: Benlate (benomyl) 0.75 lb ai/A, May 30 and June 13

Harvest: Main crop, July 30; second crop, Oct 18

Experimental Design: Randomized complete block with four replications

Comments: Severe sheath blight and rotten neck blast reduced yields for most entries. Most of the observed lodging was due to sheath blight damage. Sheath blight in the first crop also limited second crop regrowth for some entries (Tables 23 and 24).

TABLE 23. AGRONOMIC PERFORMANCE OF 1991 ADVANCED YIELD TEST, VERMILLION PARISH, LA.

1991 ENTRY	PEDIGREE	SEEDLING VIGOR*	DAYS TO 50% HEADING	HEIGHT (IN)	LODGING (%)	YIELD (LB/A)	DUNCAN'S TEST**	MILLING % (WHL-TOT)
218	RX CL	6	87	39	43	7907	A	58-67
208	SMARS/MARS//MARS	4	87	37	15	6845	B	63-70
211	SMARS/MARS//MARS	4	86	37	24	6750	B	63-70
BENGAL	BNGL	4	87	37	35	6413	BC	61-69
202	LMNT/NWBT/3/L202...	4	80	39	31	6315	BCD	59-71
ROSEMONT	RSMT	5	80	37	19	6168	BCD	56-69
204	L202/LMNT	5	84	39	9	5967	CDE	54-69
206	NWBT/LMNT//TBNT	6	87	38	13	5794	CDEF	53-69
203	L202/LMNT	5	84	39	9	5790	CDEF	55-69
213	L202/TBNT	3	83	41	18	5643	DEF	55-69
LACASSINE	LCSN	6	87	37	34	5594	DEF	56-70
205	M101/MARS/3/NTAI...	4	85	36	78	5387	EFG	68-72
224	LMNT/MERC//MERC	2	86	38	40	5376	EFGH	65-71
220	LMNT//L202/CICA8	4	86	37	36	5329	EFGH	46-65
201	LMNT//L202/TDCN	5	86	37	4	5324	EFGH	55-69
223	MERC/RICO	5	85	41	78	5315	EFGH	65-72
RICO 1	RICO	5	89	42	89	5310	EFGH	59-69
219	L202/TBNT	5	78	38	6	5302	EFGH	58-69
221	M101/MARS/3/NTAI...	4	85	36	85	5289	EFGH	65-71
CYPRESS	CPRS	3	86	37	4	5261	EFGH	55-67
212	M201/3/5442/UNK/...	5	80	37	41	5243	EFGH	65-71
209	8002610/CICA9	5	87	42	4	5167	FGHI	56-68
210	LMNT/DLLA	5	85	41	31	5117	FGHI	56-69
215	LMNT/DLLA	7	86	37	26	5109	FGHI	55-70
222	LMNT/DLLA	6	85	40	39	5068	FGHI	60-70
216	MERC/LMNT//MERC	4	87	37	10	4778	GHI	61-70
ORION	ORIN	4	86	40	85	4586	HI	62-71
KATY	KATY	3	86	45	86	4422	I	54-66
217	LBLE-SC-5	7	92	43	0	3689	J	43-63
MARS	MARS	4	88	45	90	3508	J	62-70
C.V.		16.0	1.9	3.2	-	8.5		6.0-2.1

* SUBJECTIVE RATING 1 TO 9, WHERE 1 = EXCELLENT, 9 = POOR.
** NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 24. YIELDS OF MAIN AND RATOON CROP OF ADVANCED YIELD TEST, VERMILLION PARISH, LA.

1991 ENTRY	PEDIGREE	RATOON HEIGHT (IN)	MAIN CROP YIELD	RATOON CROP YIELD	YIELD TOTAL	DUNCAN'S TEST*
			------------LBS/A @12%M------------			
218	RX CL	30	7907	2031	9938	A
204	L202/LMNT	30	5967	2585	8552	B
211	SMARS/MARS//MARS	29	6750	1728	8477	BC
202	LMNT/NWBT/3/L202	31	6315	2151	8466	BC
214	MARS/M201//MARS	30	6413	2021	8434	BC
208	SMARS/MARS//MARS	30	6845	1563	8408	BC
203	L202/LMNT	29	5790	2334	8123	BCD
ROSEMONT	RSMT	30	6168	1860	8028	BCDE
206	NWBT/LMNT//TBNT	30	5794	1868	7662	BCDEF
213	L202/TBNT	31	5643	1836	7479	CDEFG
215	LMNT/DLLA	31	5109	2214	7323	DEFGH
207	L202/LMNT	30	5261	1923	7184	DEFGHI
222	LMNT/DLLA	32	5068	2069	7137	DEFGHI
219	L202/TBNT	31	5302	1817	7119	DEFGHI
205	M101/MARS/3/NTAI	30	5387	1702	7089	EFGHI
212	M201/3/5442/UNK/	29	5243	1833	7076	EFGHI
224	LMNT/MERC//MERC	31	5376	1694	7070	EFGHI
201	LMNT//L202/TDCN	30	5324	1708	7032	EFGHI
LACASSINE	LCSN	32	5594	1376	6970	FGHI
216	MERC/LMNT//MERC	30	4778	2164	6942	FGHI
223	MERC/RICO	30	5315	1606	6921	FGHI
209	8002610/CICA9	32	5167	1695	6862	FGHI
220	LMNT//L202/CICA8	32	5329	1461	6790	FGHI
210	LMNT/DLLA	32	5117	1660	6777	FGHI
RICO 1	RICO	29	5310	1389	6699	FGHI
221	M101/MARS/3/NTAI	28	5289	1244	6533	GHIJ
ORION	ORIN	31	4586	1804	6390	HIJ
217	LBLE-SC-5	36	3689	2683	6372	HIJ
KATY	KATY	34	4422	1781	6203	IJ
MARS	MARS	33	3508	2193	5701	J
C.V.						

* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

Combined Analyses: Table 25 contains agronomic yield and milling data averaged over the five locations of the 1991 Advanced Yield tests.

TABLE 25. AGRONOMIC PERFORMANCE OF 1991 ADVANCED YIELD TEST, FIVE LOCATION MEAN, LA.

1991 ENTRY	PEDIGREE	SEEDLING VIGOR*	DAYS TO 50% HEADING	HEIGHT (IN)	LODGING (%)	YIELD (LB/A)	DUNCAN'S TEST**	MILLING % (WHL-TOT)
218	RX CL	5	86	38	16	8687	A	60-69
RICO 1	RICO	5	87	43	38	8025	B	63-71
BENGAL	BNGL	5	85	37	13	7621	C	64-71
211	SMARS/MARS//MARS	4	86	36	11	7378	CD	68-71
204	L202/LMNT	5	83	38	5	7310	CDE	60-70
208	SMARS/MARS//MARS	4	86	36	8	7267	CDEF	65-70
220	LMNT//L202/CICA8	5	87	37	9	7174	DEFG	54-68
206	NWBT/LMNT//TBNT	6	87	38	14	7160	DEFGH	60-71
ROSEMONT	RSMT	5	80	35	6	7005	DEFGHI	57-71
223	MERC/RICO	5	83	40	33	6940	DEFGHIJ	68-73
213	L202/TBNT	4	84	40	4	6929	DEFGHIJ	57-70
202	LMNT/NWBT/3/L202...	5	81	39	7	6896	EFGHIJ	60-72
LACASSINE	LCSN	6	87	37	7	6826	FGHIJK	61-72
ORION	ORIN	4	83	41	37	6803	GHIJK	64-71
MARS	MARS	4	85	45	38	6754	GHIJK	64-71
CYPRESS	CPRS	4	87	38	1	6741	GHIJK	62-70
205	M101/MARS/3/NTAI...	5	83	36	24	6712	GHIJK	65-72
209	8002610/CICA9	6	87	43	1	6703	HIJK	60-69
221	M101/MARS/3/NTAI...	5	84	36	29	6699	HIJK	65-72
203	L202/LMNT	5	85	37	2	6695	HIJK	62-72
201	LMNT//L202/TDCN	5	87	37	1	6587	IJKL	61-72
224	LMNT/MERC//MERC	4	85	38	25	6560	IJKLM	65-72
210	LMNT/DLLA	6	85	37	9	6518	JKLMN	62-72
219	L202/TBNT	6	74	37	1	6496	JKLMN	63-72
212	M201/3/5442/UNK/...	6	78	35	22	6487	JKLMN	65-71
222	LMNT/DLLA	6	85	39	15	6379	KLMN	65-72
216	MERC/LMNT//MERC	5	85	37	5	6181	LMN	62-71
215	LMNT/DLLA	7	86	37	11	6117	MN	59-72
KATY	KATY	4	87	44	36	6074	N	59-69
217	LBLE-SC-5	6	90	41	0	5425	O	55-66
C.V.		16.0	2.5	4.1	-	8.9		5.8-0.7

* SUBJECTIVE RATING 1 TO 9, WHERE 1 = EXCELLENT, 9 = POOR.
** NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

PRELIMINARY YIELD TESTS

The preliminary yield tests provide the first stage of replicated testing of promising experimental lines in field plots. The more promising selections will be advanced for further testing.

Experiment: Preliminary Yield Tests (Entries 501-900)

Location: Rice Research Station

Seeding Rate/Date: 100 lb/A, Apr 24, 1991

Planting Method: Drill-seeded

Fertilization: 50-50-50 (lb/A N-P_2O_5-K_2O), preplant incorporated, Apr 24;
70 lb N/A, May 15

Plot Size: 4.66 x 16 ft (74.5 ft^2)

Water Management: Flooded, May 15; harvest drainage (entries 501-550), Aug 1;
(entries 551-900), Aug 6

Herbicides: Stam (propanil) 4 lb ai/A, May 14; Londax (bensulfuron-methyl) 1.0 oz ai/A, June 5

Insecticides: Furadan (carbofuran) 0.6 lb ai/A, May 20

Harvest: Entries 501-550, Aug 14; entries 551-900, Aug 20-21

Experimental Design: Randomized complete block with two replications

Comments: Yields were generally low due to severe rotten neck blast. Sheath blight disease was moderate. Entries 501-700 were long grains, 701-825 were medium grains, and 826-900 were special purpose lines (Tables 26-41).

TABLE 26. AGRONOMIC PERFORMANCE OF 1991 PRELIMINARY YIELD TESTS, VERY EARLY LONG GRAINS, RICE RESEARCH STATION, CROWLEY, LA.

1991 ENTRY	PEDIGREE	SEEDLING VIGOR*	DAYS TO 50% HEADING	HEIGHT (IN)	LODGING (%)	YIELD (LB/A)	DUNCAN'S TEST**	MILLING % (WHL-TOT)
521	82CAY21/LMNT	6	77	38	0	6405	A	64-70
503	LMNT/NWBT//80Y50	7	74	35	0	6160	AB	52-69
515	82CA421/LMNT//LM	7	77	37	0	6155	AB	58-69
519	M101/LBLE*2/3/..	5	67	35	0	5855	ABC	49-68
504	NWBT/LMNT/3/V6DW	8	76	36	0	5817	ABCD	58-69
512	LMNT*2/82CAY21	8	70	37	0	5800	ABCD	55-70
505	NWBT/LMNT//82CAY	6	71	36	0	5704	ABCD	57-69
MAYBELLE	MBLE	5	66	41	0	5667	ABCD	56-70
TEBONNET	TBNT	5	71	51	20	5552	BCDE	52-68
516	82CA421/LMNT//LM	6	75	38	0	5476	BCDE	60-70
513	82CA421/LMNT//LM	5	72	37	0	5419	BCDE	58-69
520	82CAY21/TBNT	5	75	38	0	5385	CDE	57-69
502	M101/LBLE*2/3/BP	5	77	39	0	5371	CDEF	57-69
518	82CA421/LMNT//LM	7	76	38	0	5257	CDEF	60-70
509	82CA421//LMNT/LE	5	71	37	0	5235	CDEF	50-69
517	82CA421/LMNT//LM	6	74	38	0	5177	CDEFG	55-66
510	82CA421/LMNT//LM	6	69	40	0	5157	CDEFG	46-69
507	82CA421//LMNT/LE	6	70	38	0	5076	DEFG	52-70
514	82CA421/LMNT//LM	5	74	38	0	4887	EFG	56-68
501	M101/LBLE*2/3/BP	5	73	39	0	4847	EFG	49-68
511	82CA421/LMNT//LM	6	74	34	0	4798	EFG	49-69
522	M101/LBLE*2/3/..	5	69	38	0	4625	FG	52-66
508	82CA421//LMNT/LE	6	77	35	0	4449	G	56-72
506	82CA421//LMNT/LE	6	74	41	0	3938	HI	38-65
ROSEMONT	RSMT	6	70	34	0	3569	I	38-62
C.V.		14.0	1.8	3.9	-	6.0		3.0-2.4

* SUBJECTIVE RATING 1 TO 9, WHERE 1 = EXCELLENT, 9 = POOR.
** NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 27. AGRONOMIC PERFORMANCE OF 1991 PRELIMINARY YIELD TESTS, GROUP XII, EARLY LONG GRAINS, RICE RESEARCH STATION, CROWLEY, LA.

1991 ENTRY	PEDIGREE	SEEDLING VIGOR*	DAYS TO 50% HEADING	HEIGHT (IN)	LODGING (%)	YIELD (LB/A)	DUNCAN'S TEST**	MILLING % (WHL-TOT)
531	NWBT/LMNT//82CAY	7	78	37	0	6035	A	63-70
530	L201/LMNT//LMNT	6	85	33	0	5781	AB	46-68
535	80Y50/LBLE//LMNT	6	85	35	0	5672	ABC	52-67
526	M101/LBLE*2//80Y	6	77	36	0	5616	ABCD	61-71
CYPRESS	CPRS	5	27	38	0	5517	ABCDE	62-69
537	80Y50/LBLE//LMNT	7	82	36	0	5459	ABCDE	52-66
544	80Y50/LBLE//LMNT	6	83	35	0	5286	ABCDEF	55-68
545	80Y50/LBLE//LMNT	7	80	36	0	5215	BCDEFG	56-67
548	82CAY21/LEAH	5	78	38	0	5213	BCDEFG	55-67
538	80Y50/LBLE//LMNT	6	82	34	0	5198	BCDEFG	54-67
528	M101/LBLE*2/3/BP	6	77	38	0	5121	BCDEFG	54-65
542	80Y50/LBLE//LMNT	7	83	36	0	5036	BCDEFGH	59-70
536	80Y50/LBLE//LMNT	5	82	33	0	5016	BCDEFGH	57-69
539	80Y50/LBLE//LMNT	8	85	35	0	4874	CDEFGH	54-68
532	NWBT/LMNT//82CAY	7	77	40	0	4821	DEFGH	54-67
540	80Y50/LBLE//LMNT	7	86	35	0	4727	EFGH	51-67
543	80Y50/LBLE//LMNT	6	84	36	0	4640	FGH	54-67
546	82CAY21//LMNT/LE	6	77	34	0	4561	FGH	51-66
541	80Y50/LBLE//LMNT	6	82	34	0	4557	FGH	52-68
529	M101/LBLE*2/3/BP	6	77	38	0	4550	FGH	56-65
533	NWBT/LMNT//82CAY	6	78	42	0	4549	FGH	57-68
534	NWBT/LMNT//82CAY	7	77	36	0	4499	FGH	49-64
547	82CAY21//LMNT/LE	6	76	35	0	4427	GH	52-67
LACASSINE	LCSN	6	76	35	0	4249	H	45-64
527	M101/LBLE*2/3/BP	7	76	36	0	3160	I	44-62
C.V.		7.3	18.6	2.9	-	6.8		4.6-1.8

* SUBJECTIVE RATING 1 TO 9, WHERE 1 = EXCELLENT, 9 = POOR.
** NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 28. AGRONOMIC PERFORMANCE OF 1991 PRELIMINARY YIELD TESTS, EARLY LONG GRAINS, RICE RESEARCH STATION, CROWLEY, LA.

1991 ENTRY	PEDIGREE	SEEDLING VIGOR*	DAYS TO 50% HEADING	HEIGHT (IN)	LODGING (%)	YIELD (LB/A)	DUNCAN'S TEST**	MILLING % (WHL-TOT)
570	BLMT/7802192(851	6	80	40	0	6301	A	60-70
571	BLMT/7802192(851	6	77	36	0	6099	AB	64-72
566	82CAY21/LMNT(851	6	81	38	0	6083	AB	64-71
569	BLMT/7802192(851	6	78	38	0	6056	AB	58-71
556	82CAY21/LMNT/3/B	6	80	40	0	5768	ABC	50-65
568	BLMT/7802192(851	7	81	36	0	5716	BCD	59-70
565	82CAY21/LMNT(851	7	79	35	0	5517	CDE	55-67
558	82CAY21/LMNT(851	6	76	34	0	5495	CDEF	60-70
554	82CAY21/LMNT/3/B	6	79	39	0	5484	CDEF	52-67
559	82CAY21/LMNT(851	6	77	36	0	5479	CDEF	58-68
561	82CAY21/LMNT(851	6	76	34	0	5433	CDEFG	61-68
557	82CAY21/LMNT(851	6	77	35	0	5409	CDEFGH	57-69
555	82CAY21/LMNT/3/B	6	79	39	0	5394	CDEFGH	54-65
560	82CAY21/LMNT(851	6	74	36	0	5150	DEFGH	61-70
551	82CAY21/LMNT/3/8	6	72	37	0	5091	EFGH	48-67
553	82CAY21/LMNT/3/B	6	79	38	0	4987	EFGHI	42-61
563	82CAY21/LMNT(851	7	79	37	0	4979	EFGHI	50-66
562	82CAY21/LMNT(851	6	80	35	0	4967	EFGHI	56-67
LEMONT	LMNT	6	79	38	0	4964	EFGHI	55-68
552	82CAY21/LMNT/3/8	6	74	39	0	4931	FGHI	44-63
573	BP87/9902//LMNT/	5	80	36	0	4921	FGHI	59-71
564	82CAY21/LMNT(851	7	82	35	0	4861	GHI	49-65
572	BP87/9902//LMNT/	6	78	38	0	4843	HI	48-71
567	82CAY21/LMNT(851	7	81	37	0	4470	I	47-66
LA 2146	2146	4	81	44	0	3443	J	44-64
C.V.		11.1	2.1	2.8	-	4.5		6.2-1.7

* SUBJECTIVE RATING 1 TO 9, WHERE 1 = EXCELLENT, 9 = POOR.

** NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 29. AGRONOMIC PERFORMANCE OF 1991 PERLIMINARY YIELD TESTS, EARLY LONG GRAINS, RICE RESEARCH STATION, CROWLEY, LA.

1991 ENTRY	PEDIGREE	SEEDLING VIGOR*	DAYS TO 50% HEADING	HEIGHT (IN)	LODGING (%)	YIELD (LB/A)	DUNCAN'S TEST**	MILLING % (WHL-TOT)
576	BP87/9902//LMNT*	5	79	34	0	6214	A	62-70
588	LMNT/3/BP87/9902	6	77	35	0	6041	AB	61-71
597	LMNT/NWBT//80Y50	7	76	36	0	5859	ABC	47-69
592	LMNT//NWBT/LMNT	7	81	39	0	5844	ABC	60-69
596	LMNT/NWBT//80Y50	6	74	33	0	5822	ABC	47-68
595	LMNT/NWBT//80Y50	6	75	35	0	5765	ABCD	57-70
587	LMNT//BLMT/78021	6	78	37	0	5644	ABCDE	58-68
581	LMNT/3/9881/3315	7	81	36	0	5576	ABCDEF	57-68
577	L201/LMNT//80Y50	5	75	36	0	5545	BCDEF	53-69
GULFMONT	GFMT	5	78	37	0	5511	BCDEFG	56-69
LA 2031	2031	4	69	37	0	5397	BCDEFGH	54-66
585	LMNT//BLMT/78021	6	79	37	0	5311	CDEFGH	51-66
594	LMNT/NWBT//80Y50	6	77	34	0	5267	CDEFGH	44-66
583	LMNT//BLMT/78021	6	79	36	0	5256	CDEFGH	52-66
584	LMNT/NWBT//82CAY	5	74	38	0	5204	CDEFGH	52-65
586	LMNT//BLMT/78021	5	78	38	0	5136	DEFGH	51-66
589	LMNT/3/BP87/9902	6	85	35	0	5134	DEFGH	50-65
590	LMNT/3/BP87/9902	7	84	36	0	5003	EFGHI	52-64
591	LMNT/3/BP87/9902	6	84	35	0	4955	FGHI	55-67
593	LMNT//LMNT/IRGA4	6	79	46	0	4874	GHI	43-66
579	L201/LMNT/3/82CA	5	75	37	0	4826	HI	52-66
678	L201/LMNT//80Y50	5	75	39	0	4781	HI	43-65
580	L201/LMNT/3/BP87	5	80	38	0	4450	IJ	50-65
582	LMNT//BLMT/78021	5	79	39	0	4156	JK	51-66
598	TTEP/*LMNT/3/82C	6	74	41	0	3753	L	32-62
C.V.		12.4	1.3	3.1	-	5.3		4.8-1.8

* SUBJECTIVE RATING 1 TO 9, WHERE 1 = EXCELLENT, 9 = POOR.
** NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 30. AGRONOMIC PERFORMANCE OF 1991 PRELIMINARY YIELD TESTS, EARLY LONG GRAINS, RICE RESEARCH STATION, CROWLEY, LA.

1991 ENTRY	PEDIGREE	SEEDLING VIGOR*	DAYS TO 50% HEADING	HEIGHT (IN)	LODGING (%)	YIELD (LB/A)	DUNCAN'S TEST**	MILLING % (WHL-TOT)
621	LMNT/82CAY81	5	81	38	0	6212	A	51-66
618	LMNT*2/82CAY83	6	94	42	0	6209	A	59-67
620	LMNT/82CAY81	5	81	39	0	6155	A	49-66
614	LMNT//NWBT/LEAH	7	83	36	0	5779	AB	63-70
611	LMNT//NWBT/LEAH	5	79	39	0	5737	ABC	58-66
622	LEAH/SKBT//TTEP/	5	77	35	0	5712	ABC	57-69
619	80Y50/LBLE/LMNT	6	79	38	0	5679	ABCD	46-68
609	NWBT/LMNT//CI110	6	79	35	0	5669	ABCD	47-69
613	LMNT//NWBT/LEAH	6	81	39	0	5618	ABCD	62-69
605	NWBT/LMNT/3/82CA	8	78	38	0	5460	BCDE	48-66
612	LMNT//NWBT/LEAH	5	80	38	0	5394	BCDE	64-71
TX 3072	3072	6	77	38	0	5383	BCDE	48-64
606	NWBT/LMNT//L201/	7	83	36	0	5258	BCDEF	58-68
604	LMNT/NWBT/3/BP87	7	80	37	0	5162	BCDEF	47-64
607	RXMT/3/82CAY21//	7	79	37	0	5148	BCDEF	56-65
603	LMNT/NWBT/3/BP87	6	82	35	0	5063	CDEF	50-64
617	LMNT*2/CICA6	7	82	38	0	5002	DEF	54-67
616	LMNT*2/CICA6	7	82	38	0	4902	EFG	54-67
602	LMNT/NWBT/3/BP87	7	81	39	0	4797	EFGH	54-66
610	NWBT/LMNT//NWBT/	6	84	35	0	4627	FGH	51-67
623	TTEP/*LMNT/3/82C	6	74	39	0	4339	GHI	36-63
608	RXMT/3/82CAY21//	7	83	38	0	4208	HI	43-60
601	LMNT/NWBT//80Y50	6	80	36	0	3882	IJ	44-66
NEWBONNET	NWBT	4	81	45	0	3569	J	33-59
615	85CAY22//CI11048	7	74	43	0	2836	K	39-64
C.V.		13.8	1.9	2.7	-	5.7		6.9-1.9

* SUBJECTIVE RATING 1 TO 9, WHERE 1 = EXCELLENT, 9 = POOR.
** NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 31. AGRONOMIC PERFORMANCE OF 1991 PERLIMINARY YIELD TESTS, EARLY LONG GRAIN, RICE RESEARCH STATION, CROWLEY, LA.

1991 ENTRY	PEDIGREE	SEEDLING VIGOR*	DAYS TO 50% HEADING	HEIGHT (IN)	LODGING (%)	YIELD (LB/A)	DUNCAN'S TEST**	MILLING % (WHL-TOT)
CYPRESS	CPRS	5	76	39	0	6483	A	63-70
628	80Y50/LBLE//LMNT	5	78	36	0	6366	AB	63-72
626	LEAH/SKBT//TTEP/	5	78	34	0	6291	AB	62-72
KATY	KATY	4	78	45	25	6085	ABC	65-70
632	80Y50/LBLE//LMNT	6	80	35	0	6056	ABCD	56-68
627	80Y50/LBLE//LMNT	5	79	34	0	6015	ABCDE	63-71
634	80Y50/LBLE//LMNT	6	79	38	0	5947	ABCDEF	58-68
636	82CAY21/8001190/	5	76	39	0	5940	ABCDEF	61-72
631	80Y50/LBLE//LMNT	6	80	36	0	5940	ABCDEF	54-69
633	80Y50/LBLE//LMNT	7	80	37	0	5840	ABCDEFG	59-69
647	80Y50/LBLE//LMNT	6	78	35	0	5737	BCDEFG	52-67
630	80Y50/LBLE//LMNT	6	80	38	0	5669	BCDEFGH	55-67
637	80Y50/LBLE//LMNT	5	75	36	0	5512	CDEFGHI	55-69
629	80Y50/LBLE//LMNT	6	81	37	0	5455	CDEFGHI	56-68
644	RXMT//82CAY21/LM	6	78	37	0	5423	CDEFGHI	62-70
639	NWBT/LMNT//80Y50	6	72	35	0	5403	CDEFGHI	52-67
643	RXMT//82CAY21/LM	5	73	35	0	5379	CDEFGHI	55-68
641	LMNT*2/CICA6	6	80	37	0	5346	DEFGHI	56-69
638	80Y50/LBLE//LMNT	6	77	38	0	5329	EFGHI	50-68
646	80Y50/LBLE//LMNT	6	77	35	0	5275	FGHI	55-69
640	82CAY21/NWRX	6	75	37	0	5206	GHI	60-68
642	M101/LBLE*2/3/BP	5	75	39	0	5132	GHI	59-67
LACASSINE	LCSN	5	76	36	0	4987	HI	49-66
645	LMNT/NWBT//80Y50	6	75	38	0	4848	IJ	46-70
635	NWBT*2//TTEP/IR8	6	76	37	0	4262	J	32-59
C.V.		12.8	1.7	3.7	-	5.3		4.7-2.4

* SUBJECTIVE RATING 1 TO 9, WHERE 1 = EXCELLENT, 9 = POOR.
** NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 32. AGRONOMIC PERFORMANCE OF 1991 PRELIMINARY YIELD TESTS, EARLY LONG GRAIN, RICE RESEARCH STATION, CROWLEY, LA.

1991 ENTRY	PEDIGREE	SEEDLING VIGOR*	DAYS TO 50% HEADING	HEIGHT (IN)	LODGING (%)	YIELD (LB/A)	DUNCAN'S TEST**	MILLING % (WHL-TOT)
669	82CAY21/LMNT/80Y	6	76	39	0	6634	A	55-68
CYPRESS	CPRS	4	76	40	0	6266	AB	64-71
668	82CAY21/LMNT/80Y	5	77	39	0	6140	ABC	53-67
672	82CAY21/LMNT/80Y	6	78	38	0	6124	ABC	62-71
667	82CAY21/LMNT/80Y	6	76	38	0	6055	ABCD	54-67
655	BP87/9902//LMNT/	6	78	32	0	6040	ABCD	59-69
659	L201/LMNT//LMNT	5	82	36	0	5993	ABCDE	56-70
651	80Y50/LBLE//LMNT	5	77	37	0	5959	ABCDE	57-67
652	80Y50/LBLE//LMNT	5	77	37	0	5931	ABCDE	56-68
661	LBNTX2/82CAY21//	6	77	35	0	5757	BCDEF	59-70
LEMONT	LMNT	5	78	37	0	5626	BCDEF	59-70
670	82CAY21/LMNT/80Y	6	76	39	0	5464	BCDEFG	55-68
656	BP87/9902//LMNT/	5	78	34	0	5410	CDEFG	56-69
662	82CAY21/LMNT//LM	5	72	32	0	5396	CDEFG	55-71
653	82CAY21/LMNT/LEA	5	76	36	0	5362	CDEFG	54-66
664	LMNT*2/CR1113//8	5	70	34	0	5346	CDEFG	57-70
673	82CAY21/LMNT	5	75	37	0	5336	CDEFG	59-69
660	LBNTX2/82CAY21//	5	79	39	0	5328	CDEFG	54-67
671	82CAY21/LMNT/80Y	6	75	40	0	5304	CDEFG	52-68
657	L201/LMNT/3/82CA	6	73	34	0	5215	DEFGH	52-70
654	82CAY21/LMNT(851	5	78	36	0	5208	DEFGH	57-67
665	LMNT*2/CR1113//8	6	71	35	5	5155	EFGH	57-70
658	L201/LMNT/3/82CA	5	74	36	0	4987	FGH	58-69
666	NWBT/LMNT/LMNT*2	6	75	36	5	4727	GH	53-68
663	NWBT/LMNT//NWBT	5	91	41	0	4472	H	44-65
C.V.		10.1	1.8	2.5	-	6.3		4.9-2.1

* SUBJECTIVE RATING 1 TO 9, WHERE 1 = EXCELLENT, 9 = POOR.
** NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 33. AGRONOMIC PERFORMANCE OF 1991 PRELIMINARY YIELD TESTS, EARLY LONG GRAINS, RICE RESEARCH STATION, CROWLEY, LA.

1991 ENTRY	PEDIGREE	SEEDLING VIGOR*	DAYS TO 50% HEADING	HEIGHT (IN)	LODGING (%)	YIELD (LB/A)	DUNCAN'S TEST**	MILLING % (WHL-TOT)
686	20001-5/LMNT	5	79	42	0	6563	A	58-67
692	LMNT/20001-5	4	76	40	0	6531	AB	61-71
678	82CAY21/LMNT/80Y	6	79	40	0	6470	AB	62-71
688	LMNT/20001-5	4	79	40	0	6333	ABC	59-67
685	20001-5/LMNT	5	80	42	0	6230	ABCD	63-67
683	20001-5/LMNT	4	79	38	0	6204	ABCD	61-67
676	82CAY21/LMNT/80Y	5	76	38	0	6199	ABCD	60-70
677	82CAY21/LMNT/80Y	5	79	38	0	6145	ABCD	62-70
682	LMNT/20001-5	5	80	42	0	6019	ABCDE	63-68
691	LMNT/20001-5	5	76	45	0	5999	ABCDE	49-66
687	20001-5/LMNT	6	81	39	0	5818	ABCDEF	62-67
689	LMNT/20001-5	5	78	41	0	5781	ABCDEFG	58-69
695	LMNT/20001-5	6	77	39	0	5758	ABCDEFG	61-66
693	LMNT/20001-5	5	81	42	0	5728	ABCDEFG	50-68
696	L202/LMNT	5	77	35	0	5707	BCDEFG	60-69
690	LMNT/20001-5	6	80	41	0	5592	CDEFG	61-67
684	20001-5/LMNT	5	81	39	0	5494	CDEFG	61-67
694	LMNT/20001-5	7	76	40	0	5387	DEFG	54-68
697	L202/LMNT	4	73	36	0	5294	EFGH	61-70
681	LMNT/20001-5	7	78	37	0	5102	FGH	60-67
GULFMONT	GFMT	5	77	37	0	5037	FGH	57-70
680	82CAY21/LMNT//LM	4	73	35	0	4954	GH	59-70
698	L202/LMNT	4	75	37	0	4937	GH	58-69
679	82CAY21/LMNT//LM	4	73	34	20	4526	HI	61-71
LA 2146	2146	4	80	45	0	3931	I	48-65
C.V.		13.3	1.6	3.0	-	6.2		3.1-1.3

* SUBJECTIVE RATING 1 TO 9, WHERE 1 = EXCELLENT, 9 = POOR.
** NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 34. AGRONOMIC PERFORMANCE OF 1991 PRELIMINARY YIELD TESTS, VERY EARLY MEDIUM GRAINS, RICE RESEARCH STATION, CROWLEY, LA.

1991 ENTRY	PEDIGREE	SEEDLING VIGOR*	DAYS TO 50% HEADING	HEIGHT (IN)	LODGING (%)	YIELD (LB/A)	DUNCAN'S TEST**	MILLING % (WHL-TOT)
ORION	ORIN	4	78	43	30	6656	A	66-70
707	MERC/PCOS	5	73	35	0	6082	AB	60-70
710	NTAI/NVDF//M401/	7	78	37	0	6042	ABC	66-73
718	MERCX2/MERC (BP)	5	73	46	15	5855	BCD	62-69
714	NWBT/BLMT//MARS/	5	71	40	0	5817	BCD	60-68
711	NTAI/NVDF//M401/	6	76	37	0	5777	BCDE	66-71
701	MERC/CAM9/MARS	6	70	37	0	5712	BCDE	66-72
712	NTAI/NVDF//M401/	6	78	40	5	5627	BCDE	65-71
704	MERC/NTAI	5	72	40	5	5611	BCDEF	64-70
705	MERC/NTAI	5	70	36	0	5556	BCDEFG	66-71
717	MERCX2/MERC (BP)	6	76	44	0	5467	BCDEFGH	55-68
709	NTAI/NVDF//M401/	7	76	38	0	5383	BCDEFGH	66-70
706	MERC/NTAI	6	74	36	0	5364	BCDEFGH	54-71
716	MERCX2/MERC (BP)	6	74	44	5	5274	BCDEFGH	57-68
703	MERC/HUNAN E DWA	7	69	35	0	5214	CDEFGH	62-71
708	MERC//LMNT/MERC	5	73	37	0	5109	DEFGHI	62-68
715	MERCX2/MERC (BP)	5	74	44	20	4966	EFGHI	55-67
723	9906/9633/M401	5	69	38	0	4779	FGHIJ	59-68
720	M201/4/S242/UNKN	5	73	39	0	4768	GHIJ	64-67
713	NWBT/BLMT//MARS/	5	74	37	0	4708	HIJ	59-69
722	9906/9633/M401	5	70	34	0	4648	HIJ	56-67
719	MERC//LMNT/MERC	5	67	39	0	4633	HIJ	57-69
721	MERC/RICO1	6	70	44	30	4365	IJ	52-64
702	MERC/CHAO LANG #	6	76	34	0	4339	IJ	63-71
MERCURY	MERC	5	76	37	0	4086	J	60-70
C.V.		12.8	1.2	3.7	-	6.6		5.2-1.5

* SUBJECTIVE RATING 1 TO 9, WHERE 1 = EXCELLENT, 9 = POOR.
** NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 35. AGRONOMIC PERFORMANCE OF 1991 PRELIMINARY YIELD TESTS, EARLY MEDIUM GRAINS, RICE RESEARCH STATION, CROWLEY, LA.

1991 ENTRY	PEDIGREE	SEEDLING VIGOR*	DAYS TO 50% HEADING	HEIGHT (IN)	LODGING (%)	YIELD (LB/A)	DUNCAN'S TEST**	MILLING % (WHL-TOT)
741	MERC/RICO 1	5	79	42	0	6991	A	54-69
744	MERC/RICO 1	5	80	43	0	6681	AB	64-70
731	MERC//LMNT/MERC	4	77	40	0	6582	ABC	61-69
732	MERC//MERC/GCHW/	5	79	40	0	6327	ABCD	54-68
735	MERC/BRAZ	5	75	39	0	6070	ABCDE	61-69
748	CI11048/LEAH//TT	5	78	37	0	5819	BCDEF	53-70
733	MERC//MERC/GCHW/	4	80	43	0	5706	BCDEFG	58-69
RICO 1	RICO	5	80	48	55	5609	CDEFGH	52-67
745	MERC/RICO 1	4	79	38	0	5506	DEFGH	58-66
740	MERC/RICO 1	6	71	49	5	5492	DEFGH	45-68
742	MERC/RICO 1	6	81	42	0	5489	DEFGH	55-69
730	MERC/1711X2	5	70	38	0	5367	DEFGH	61-70
737	MERC/BRAZ	5	77	41	0	5309	DEFGH	39-65
743	MERC/RICO 1	6	80	37	0	5302	DEFGH	53-70
726	MERC//MERC/NAMGH	5	73	41	0	5245	EFGHI	64-69
MARS	MARS	4	78	48	35	5219	EFGHI	62-67
727	MERC/1711X2	5	71	40	5	5081	EFGHI	53-67
736	MERC/BRAZ	5	77	39	0	5036	EFGHI	60-69
728	MERC/1711X2	5	70	41	10	5013	FGHI	58-68
738	MERC/CHAO LANG #	5	76	37	0	4681	GHIJ	59-69
729	MERC/1711X2	4	70	40	25	4624	HIJ	55-67
747	1711X2/MARS//MER	4	73	45	0	4599	HIJ	55-65
734	SMARS/MARS//MARS	6	75	40	0	4276	IJ	59-67
746	MERC/RICO 1	5	74	40	0	3768	J	33-58
739	MERC/RICO 1	5	78	33	0	1980	K	17-48
C.V.		12.8	1.7	2.7	-	8.1		15.3-2.0

* SUBJECTIVE RATING 1 TO 9, WHERE 1 = EXCELLENT, 9 = POOR.
** NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 36. AGRONOMIC PERFORMANCE OF 1991 PRELIMINARY YIELD TESTS, EARLY MEDIUM GRAINS, RICE RESEARCH STATION, CROWLEY, LA.

1991 ENTRY	PEDIGREE	SEEDLING VIGOR*	DAYS TO 50% HEADING	HEIGHT (IN)	LODGING (%)	YIELD (LB/A)	DUNCAN'S TEST**	MILLING % (WHL-TOT)
752	MERC/3/NTAI/NVDF	4	74	41	0	6600	A	29-69
759	MERC/PCOS	6	77	49	90	6342	A	59-72
751	MERC/3/NTAI/NVDF	4	76	38	0	6182	AB	62-69
757	MERC/PCOS	4	75	41	0	5485	BC	61-68
760	MERC/TBNT	4	75	50	10	5417	CD	52-69
BENGAL	BNGL	4	76	40	0	5204	CDE	59-67
764	MERC//LMNT/MERC	4	78	44	0	5189	CDE	52-68
763	MERC//LMNT/MERC	4	81	39	0	5079	CDEF	61-67
766	MERC//LMNT/MERC	4	76	39	0	5068	CDEF	60-66
765	MERC//LMNT/MERC	3	81	44	35	4936	CDEFG	60-57
761	MERC/TBNT	4	77	45	0	4873	CDEFGH	49-69
RICO 1	RICO	4	79	50	85	4863	CDEFGH	56-68
773	MARSX5/MARS	3	78	45	0	4854	CDEFGH	62-67
769	LMNT/MERC//LMNT	4	74	39	0	4613	DEFGHI	55-64
771	LMNT/MERC//LMNT	4	75	39	0	4446	EFGHIJ	52-64
754	MERC/3/NTAI/NVDF	4	77	39	0	4328	FGHIJK	55-66
767	LMNT/MERC//LMNT	5	75	39	0	4245	GHIJK	55-65
770	LMNT/MERC//LMNT	5	74	38	0	4238	GHIJK	54-65
756	MERC/3/NTAI/NVDF	4	80	40	0	4178	GHIJK	47-65
762	LMNT/MERC	4	89	46	0	4075	HIJK	38-65
758	LMNT/MERC//LMNT	5	75	38	0	4056	HIJK	46-63
753	MERC/3/NTAI/NVDF	4	75	41	0	3866	IJK	48-64
768	LMNT/MERC//LMNT	5	74	38	0	3818	IJK	54-65
772	LMNT/MERC//LMNT	4	75	38	0	3653	JK	52-64
755	MERC/3/NTAI/NVDF	4	77	39	0	3579	K	37-62
C.V.		8.8	0.8	2.9	-	7.2		8.8-1.8

* SUBJECTIVE RATING 1 TO 9, WHERE 1 = EXCELLENT, 9 = POOR.
** NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 37. AGRONOMIC PERFORMANCE OF 1991 PRELIMINARY YIELD TESTS, EARLY MEDIUM GRAINS, RICE RESEARCH STATION, CROWLEY, LA.

1991 ENTRY	PEDIGREE	SEEDLING VIGOR*	DAYS TO 50% HEADING	HEIGHT (IN)	LODGING (%)	YIELD (LB/A)	DUNCAN'S TEST**	MILLING % (WHL-TOT)
791	MERC//MERC/RICO	4	74	41	0	6827	A	51-69
790	MERC/NTAI/NDVF//	4	76	40	0	6516	A	47-68
778	MERC//LMNT/MERC	5	76	39	0	5956	AB	66-70
787	SMARS/MARS//MARS	4	81	40	0	5850	ABC	59-65
788	SMARS/MARS//MARS	5	75	40	0	5400	BCD	56-66
784	SMARS/MARS//MARS	4	76	41	0	5366	BCD	51-66
798	MERC/GCHW	4	89	46	0	5316	BCD	39-66
BENGAL	BNGL	5	78	39	0	5316	BCD	52-68
782	SMARS/MARS//MARS	5	80	39	0	5096	BCDE	58-64
792	MERC//MERC/RICO	5	78	39	0	4909	BCDE	55-67
786	SMARS/MARS//MARS	4	81	40	0	4825	BCDEF	48-67
777	NTAI/NVDF//M401/	5	77	40	0	4774	CDEF	57-66
793	MERC//MERC/RICO	4	76	38	0	4736	CDEF	59-67
781	SMARS/MARS//MARS	5	80	39	0	4598	DEF	53-65
780	SMARS/MARS//MARS	4	79	39	0	4535	DEF	49-66
785	SMARS/MARS//MARS	4	81	40	0	4434	DEF	55-66
794	MERC//MERC/RICO	4	75	38	0	4404	DEF	51-63
776	LMNT/MERC//LMNT	6	75	38	0	4397	DEF	54-66
V4718	4718	4	77	39	0	4304	DEF	62-68
783	SMARS/MARS//MARS	4	79	40	0	4038	EF	54-64
789	1711X2/MARS//MER	6	74	39	0	3669	FG	57-66
795	MERC//MERC/RICO	4	75	36	0	3643	FG	43-61
796	MERC//MERC/RICO	4	75	38	0	3640	FG	52-64
797	MERC//MERC/RICO	3	75	41	0	2880	G	32-56
779	STRNX2//CI11048/	6	74	43	0	2705	G	41-60
C.V.		12.4	1.4	2.0	-	10.9		11.2-2.2

* SUBJECTIVE RATING 1 TO 9, WHERE 1 = EXCELLENT, 9 = POOR.
** NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 38. AGRONOMIC PERFORMANCE OF 1991 PRELIMINARY YIELD TESTS, EARLY MEDIUM GRAINS, RICE RESEARCH STATION, CROWLEY, LA.

1991 ENTRY	PEDIGREE	SEEDLING VIGOR*	DAYS TO 50% HEADING	HEIGHT (IN)	LODGING (%)	YIELD (LB/A)	DUNCAN'S TEST**	MILLING % (WHL-TOT)
ORION	ORIN	4	76	46	15	6683	A	57-69
807	MERC//CAM9/MARS	6	74	36	0	6496	A	42-70
809	MARS*2/L110/3/AK	4	76	34	0	6360	AB	48-65
813	MERC/LMNT//MERC	4	78	38	0	5687	ABC	53-69
BENGAL	BNGL	5	78	37	0	5247	BCD	50-67
MARS	MARS	3	76	47	35	5220	BCDE	59-67
812	MERC/LMNT//MERC	4	73	39	0	5109	CDEF	57-68
808	MERC//CAM9/MARS	4	77	44	20	4999	CDEFG	59-69
820	DOMSIAH//LMNT/NW	5	90	39	0	4412	DEFGH	49-58
816	MERC/GUICHOW/MAR	4	75	42	0	4373	DEFGH	58-67
818	MERC//LMNT/MERC	4	75	40	0	3979	EFGHI	54-65
802	MERC//MERC/NANGH	5	75	41	0	3963	EFGHI	55-65
803	MERC//MERC/NANGH	4	75	39	0	3880	FGHI	51-63
805	MERC//MERC/NANGH	4	75	38	0	3801	GHI	54-65
815	MERC/GUICHOW/MAR	5	74	39	0	3728	GHI	45-61
814	MERC/1711X2(E)	4	75	38	0	3678	HI	54-65
819	MERC//LMNT/MERC	4	75	41	0	3621	HI	47-62
804	MERC//MERC/NANGH	5	75	38	0	3587	HI	48-62
810	SMARS/MARS/3/CIC	5	75	37	0	3457	HI	50-64
817	MERC//LMNT/MERC	4	75	40	0	3417	HI	44-61
821	DOMSIAH//LMNT/NW	4	82	49	0	3295	HI	30-51
801	MERC//MERC/NANGH	4	75	38	0	3291	HI	55-65
822	DOMSIAH//LMNT/NW	4	81	47	0	3109	HI	14-48
811	SMARS/MARS/3/CIC	4	74	37	0	2892	I	47-60
806	MERC/BRAZ	4	76	39	0	2797	I	37-56
C.V.		16.1	1.0	4.2	-	12.6		17.3-4.9

* SUBJECTIVE RATING 1 TO 9, WHERE 1 = EXCELLENT, 9 = POOR.

** NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 39. AGRONOMIC PERFORMANCE OF 1991 PRELIMINARY YIELD TESTS, SPECIAL PURPOSE, RICE RESEARCH STATION, CROWLEY, LA.

1991 ENTRY	PEDIGREE	SEEDLING VIGOR*	DAYS TO 50% HEADING	HEIGHT (IN)	LODGING (%)	YIELD (LB/A)	DUNCAN'S TEST**	MILLING % (WHL-TOT)
LA 2152	LMNT/DLLA (2152)	6	72	36	0	6385	A	59-71
TORO-2	TORO2	6	82	43	0	6259	A	62-70
846	LMNT/DLLA(2152)	6	74	38	0	6050	AB	65-71
832	LMNT//82CAY21/TO	6	82	37	0	5914	ABC	58-69
DELMONT	DLMT	6	80	36	0	5879	ABCD	62-71
833	LMNT//82CAY21/TO	5	83	37	0	5844	ABCD	62-69
838	DOMSIAH//LMNT/NW	7	77	46	0	5625	ABCDE	62-70
847	LMNT/DLLA(2152)	6	73	37	0	5535	ABCDEF	58-70
834	LMNT//82CAY21/TO	7	83	35	0	5493	ABCDEF	64-71
836	DOMSIAH//LMNT/NW	5	72	43	0	5454	ABCDEF	60-71
835	DLLA/82CAY21	7	78	39	0	5410	ABCDEF	45-71
LA 2195	LMNT/DLLA(2195)	6	72	36	0	5257	ABCDEFG	61-72
829	LMNT/3/82CAY21//	6	91	38	0	5144	ABCDEFG	53-67
837	DOMSIAH//LMNT/NW	6	68	49	90	5127	ABCDEFG	56-71
828	LMNT/DLLA//TTEP/	6	79	34	0	4838	BCDEFG	55-68
830	TRO2/LBNTX2	7	83	38	0	4823	BCDEFG	47-68
831	TRO2/LBNTX2	7	87	40	0	4749	CDEFG	39-66
826	LMNT/DLLA//A301	7	82	40	0	4717	CDEFG	50-67
839	DOMSIAH//LMNT/NW	6	68	49	45	4592	DEFG	58-71
827	LMNT/DLLA//A301	8	78	46	0	4588	DEFG	47-63
843	DOMSIAH//LMNT/NW	6	72	50	45	4437	EFG	57-71
844	DOMSIAH//LMNT/NW	5	80	51	70	4336	EFG	63-74
840	DOMSIAH//LMNT/NW	5	79	49	75	4332	EFG	63-72
841	DOMSIAH//LMNT/NW	5	79	48	75	4240	FG	63-72
842	DOMSIAH//LMNT/NW	6	80	50	45	4001	G	55-73
C.V.		11.2	2.8	4.2	-	10.3		7.9-1.3

* SUBJECTIVE RATING 1 TO 9, WHERE 1 = EXCELLENT, 9 = POOR.
** NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 40. AGRONOMIC PERFORMANCE OF 1991 PRELIMINARY YIELD TESTS, SPECIAL PURPOSE, RICE RESEARCH STATION, CROWLEY, LA.

1991 ENTRY	PEDIGREE	SEEDLING VIGOR*	DAYS TO 50% HEADING	HEIGHT (IN)	LODGING (%)	YIELD (LB/A)	DUNCAN'S TEST**	MILLING % (WHL-TOT)
859	DOMSIAH/DELLAX2/	6	80	50	0	6071	A	63-71
863	DOMSIAH/DELLAX2/	6	80	47	0	5643	AB	59-69
LACASSINE	LCSN	6	76	34	0	5612	AB	54-69
871	DOMSIAH/DELLAX2/	6	75	41	40	5531	ABC	57-68
868	DOMSIAH/DELLAX2/	5	82	58	0	5208	ABCD	55-67
870	DOMSIAH/DELLAX2/	5	74	41	25	5138	ABCD	54-66
856	DOMSIAH//LMNT/NW	7	92	41	0	5100	ABCD	51-68
857	DOMSIAH//LMNT/NW	6	92	43	0	5062	ABCD	52-68
858	DOMSIAH//LMNT/NW	6	92	43	0	5029	ABCD	61-68
860	DOMSIAH/DELLAX2/	6	84	57	15	4977	ABCD	65-71
872	DOMSIAH/DELLAX2/	6	83	43	0	4949	BCD	53-68
853	DOMSIAH//LMNT/NW	6	92	42	0	4901	BCD	55-68
862	DOMSIAH/DELLAX2/	6	83	54	25	4900	BCD	63-69
855	DOMSIAH//LMNT/NW	6	91	43	0	4867	BCD	56-67
861	DOMSIAH/DELLAX2/	6	85	59	10	4841	BCD	63-69
867	DOMSIAH/DELLAX2/	6	82	57	0	4835	BCD	56-66
851	DOMSIAH//LMNT/NW	6	92	43	0	4693	BCD	44-67
873	DOMSIAH/DELLAX2/	6	83	45	0	4662	BCD	50-66
DELLA	DLLA	6	87	55	50	4644	BCD	52-69
854	DOMSIAH//LMNT/NW	6	77	36	0	4589	BCD	59-67
866	DOMSIAH/DELLAX2/	5	82	60	10	4540	BCD	56-67
852	DOMSIAH//LMNT/NW	7	94	40	0	4525	BCD	54-66
869	DOMSIAH/DELLAX2/	5	83	44	0	4405	CD	52-66
864	DOMSIAH//LMNT/NW	6	80	50	20	4373	D	54-72
865	DOMSIAH/DELLAX2/	7	79	42	0	1076	E	32-58
C.V.		8.6	1.1	2.6	-	9.6		8.3-1.7

* SUBJECTIVE RATING 1 TO 9, WHERE 1 = EXCELLENT, 9 = POOR.
** NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 41. AGRONOMIC PERFORMANCE OF 1991 PRELIMINARY YIELD TESTS, SPECIAL PURPOSE, RICE RESEARCH STATION, CROWLEY, LA.

1991 ENTRY	PEDIGREE	SEEDLING VIGOR*	DAYS TO 50% HEADING	HEIGHT (IN)	LODGING (%)	YIELD (LB/A)	DUNCAN'S TEST**	MILLING % (WHL-TOT)
LEMONT	LMNT	6	79	35	0	6188	A	60-71
JASMINE	JSMN	7	94	47	5	6038	AB	43-66
890	DOMSIAH/203/TETE	6	75	50	40	5628	ABC	56-71
878	DOMSIAH/DELLAX2/	6	77	42	0	5454	BCD	56-67
886	DOMSIAH/DELLAX2/	6	80	47	0	5438	BCD	51-68
885	DOMSIAH/DELLAX2/	6	81	47	0	5342	BCDE	58-68
897	LMNT/DLLA//TTEP/	7	92	42	0	5063	CDEF	42-61
896	DOMSIAH//LMNT/NW	5	69	36	0	4928	CDEFG	61-73
895	DOMSIAH/203/TETE	8	74	40	25	4891	CDEFG	42-70
877	DOMSIAH/DELLAX2/	6	84	43	0	4668	EFGH	48-66
876	DOMSIAH/DELLAX2/	6	83	43	0	4584	FGHI	50-66
891	DOMSIAH/203/TETE	8	73	42	25	4557	FGHI	34-70
892	DOMSIAH/203/TETE	8	73	39	20	4474	FGHI	45-69
882	DOMSIAH/DELLAX2/	6	82	44	0	4468	FGHI	52-67
879	DOMSIAH/DELLAX2/	6	91	43	0	4398	FGHI	49-66
881	DOMSIAH/DELLAX2/	5	83	60	0	4391	FGHI	53-67
880	DOMSIAH/DELLAX2/	6	83	62	0	4271	GHI	54-67
893	DOMSIAH/203/TETE	8	74	42	45	4216	GHI	48-70
894	DOMSIAH/203/TETE	8	73	39	25	3944	HI	42-70
A-301	A301	6	81	38	0	3915	I	49-66
884	DOMSIAH/DELLAX2/	7	81	42	0	3915	I	50-65
883	DOMSIAH/DELLAX2/	7	82	42	0	3186	J	47-66
889	DOMSIAH/DELLA*2/	6	84	48	0	2165	K	20-59
888	DOMSIAH/DELLA*2/	6	86	47	0	2141	K	45-67
887	DOMSIAH/DELLA*2/	5	85	46	0	1906	K	20-58
C.V.		9.0	1.2	3.6	-	7.0	15.0-3.5	

* SUBJECTIVE RATING 1 TO 9, WHERE 1 = EXCELLENT, 9 = POOR.
** NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

Experiment: Preliminary Yield Tests (Entries 901-990)

Location: Rice Research Station

Seeding Rate/Date: 100 lb/A, June 17, 1991

Planting Method: Drill-seeded

Fertilization: 50-50-50 (lb/A N-P_2O_5-K_2O), preplant incorporated, May 17;
60 lb N/A, July 3

Plot Size: 4.66 x 16 ft (74.5 ft^2)

Water Management: Flooded, July 3; harvest drainage, Sept 20

Herbicides: Stam (propanil) 3.0 lb ai/A, July 2

Harvest: Oct 10

Experimental Design: Randomized complete block with two replications

Comments: This late planting was mainly of lines returned from the Puerto Rico winter nursery. Low yields and poor milling quality were due to late planting and severe rotten neck blast disease; however, many lines outperformed check varieties (Tables 42-44).

TABLE 42. AGRONOMIC PERFORMANCE OF 1991 PRELIMINARY YIELD TESTS, PUERTO RICO ENTRIES, RICE RESEARCH STATION, CROWLEY, LA.

1991 ENTRY	PEDIGREE	SEEDLING VIGOR*	DAYS TO 50% HEADING	HEIGHT (IN)	LODGING (%)	YIELD (LB/A)	DUNCAN'S TEST**	MILLING % (WHL-TOT)
916	L202//LMNT*2/CR1	5	63	34	0	5143	A	58-70
BENGAL	BNGL	2	67	38	0	5069	AB	62-71
907	80Y50/LBLE//SLBL	4	68	36	0	4834	ABC	31-68
921	LMNT*2/CR1113//B	6	68	36	0	4822	ABC	55-66
903	MERC//MERC/GCHW/	5	69	40	0	4647	ABCD	59-68
915	L202//LMNT*2/CR1	4	65	38	0	4627	ABCD	54-67
CYPRESS	CPRS	2	70	38	0	4594	ABCD	56-66
918	LMNT*2/CR1113//B	5	67	37	0	4506	ABCD	55-69
917	LMNT*2/CR1113//B	5	69	38	0	4445	ABCDE	49-69
912	82CPY21/LMNT//LM	3	67	37	0	4429	ABCDE	53-66
909	80Y50/LBLE//SLBL	5	62	35	5	4423	ABCDE	47-69
923	LMNT*2/CR1113//B	5	67	36	0	4385	ABCDE	50-67
928	MARS	2	68	44	0	4360	ABCDEF	55-67
906	MERC//MERC/GCHW/	7	68	38	0	4326	ABCDEF	51-66
914	L202//LMNT*2/CR1	6	65	37	0	4300	BCDEFG	54-67
929	RICO	4	72	43	0	4293	BCDEFG	54-68
920	LMNT*2/CR1113//B	5	66	37	0	4281	BCDEFG	57-69
901	MERC//MERC/GCHW/	6	71	39	0	4232	CDEFGH	57-69
910	80Y50/LBLE//SLBL	5	66	37	0	4226	CDEFGH	51-72
902	MERC//MERC/GCHW/	5	70	38	0	4204	CDEFGH	56-69
919	LMNT*2/CR1113//B	6	70	36	0	4003	CDEFGH	51-67
905	MERC//MERC/GCHW/	6	71	38	0	3965	DEFGH	49-66
908	80Y50/LBLE//SLBL	5	70	37	0	3938	DEFGH	37-65
925	LACASSINE	3	71	37	0	3673	EFGHI	42-64
904	MERC//MERC/GCHW/	7	72	34	0	3545	FGHI	49-65
930	MAYBELLE	3	57	37	0	3535	FGHI	56-69
924	LMNT/NWBT(850220	4	72	34	0	3487	GHI	43-65
922	LMNT*2/CR1113//B	7	71	33	0	3435	HI	41-63
911	80Y50/LBLE//SLBL	3	72	40	0	2964	I	34-60
913	AS3510	2	51	40	0	1929	J	40-65
C.V.		10.3	1.2	3.5	-	8.2		4.4-1.4

* SUBJECTIVE RATING 1 TO 9, WHERE 1 = EXCELLENT, 9 = POOR.
** NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 43. AGRONOMIC PERFORMANCE OF 1991 PRELIMINARY YIELD TESTS, PUERTO RICO ENTRIES, RICE RESEARCH STATION, CROWLEY, LA.

1991 ENTRY	PEDIGREE	SEEDLING VIGOR*	DAYS TO 50% HEADING	HEIGHT (IN)	LODGING (%)	YIELD (LB/A)	DUNCAN'S TEST**	MILLING % (WHL-TOT)
941	MERC//BRAZ/T487/	5	66	35	0	5192	A	56-68
942	MERC//BRAZ/T487/	6	67	35	0	5092	AB	64-72
960	L202/LMNT	3	65	37	0	5019	ABC	54-67
952	MERC//M401/NTAI	5	60	35	0	4735	ABCD	67-70
943	MERC//BRAZ/T487/	5	67	38	0	4638	ABCDE	49-66
951	MERC//M401/NTAI	3	67	38	0	4635	ABCDE	63-71
953	MERC//M401/NTAI	6	63	36	0	4614	ABCDEF	56-70
948	MERC//M401/NTAI	7	64	36	0	4562	ABCDEFG	65-70
950	MERC//M401/NTAI	6	66	35	0	4416	BCDEFGH	61-70
949	MERC//M401/NTAI	6	61	36	0	4388	BCDEFGH	68-70
940	MERC/AKIHIKARI	5	67	36	0	4289	CDEFGH	59-68
938	MERC/AKIHIKARI	5	67	38	0	4287	CDEFGH	57-68
936	MERC/AKIHIKARI	5	67	36	0	4204	DEFGH	56-69
937	MERC/AKIHIKARI	5	67	35	0	4190	DEFGH	55-68
KATY	KATY	2	71	47	0	4057	DEFGHI	62-69
945	MERC//LMNT/LEAH	5	66	36	0	4038	DEFGHI	58-68
947	MERC//M401/NTAI	4	65	38	0	3945	EFGHIJ	51-68
939	MERC/AKIHIKARI	5	67	37	0	3938	EFGHIJ	56-68
934	LMNT/NWBT(850220	4	69	35	0	3875	FGHIJ	44-64
935	MERC/AKIHIKARI	5	67	36	0	3834	GHIJ	57-68
944	MERC//BRAZ/T487/	6	71	37	0	3827	GHIJ	52-64
ALAN	ALAN	2	64	41	0	3802	HIJK	56-67
946	MERC//M401/NTAI	4	62	33	0	3748	HIJKL	56-67
LEMONT	LMNT	4	71	38	0	3427	IJKL	40-63
931	LMNT/NWBT(850220	4	71	32	0	3325	IJKL	47-65
933	LMNT/NWBT(850220	5	72	34	0	3236	JKL	43-64
932	LMNT/NWBT(850220	3	72	33	0	3089	KL	40-64
954	ROSEMONT	4	63	33	0	3038	L	35-59
959	8002610/CICA9	2	72	44	0	2366	M	29-56
958	RAX CLEAR	2	71	39	-	-		48-71
C.V.		9.5	1.3	2.9	-	7.6		4.0-1.3

* SUBJECTIVE RATING 1 TO 9, WHERE 1 = EXCELLENT, 9 = POOR.
** NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 44. AGRONOMIC PERFORMANCE OF 1991 PRELIMINARY YIELD TESTS, PUERTO RICO ENTRIES, RICE RESEARCH STATION, CROWLEY, LA.

1991 ENTRY	PEDIGREE	SEEDLING VIGOR*	DAYS TO 50% HEADING	HEIGHT (IN)	LODGING (%)	YIELD (LB/A)	DUNCAN'S TEST**	MILLING % (WHL-TOT)
971	DMSI//LMNT/NWBT/	6	67	44	5	5271	A	58-71
962	DMSI//LMNT/NWBT/	8	67	44	30	5024	AB	54-69
979	DMSI/203/TTEP/4*	4	69	52	75	4825	ABC	54-70
989	2207	3	70	39	0	4475	ABCD	56-67
983	DMSI/203/TTEP/4*	7	68	39	5	4458	ABCD	34-71
987	LMNT/DLLA	4	67	33	0	4366	BCD	52-68
984	DMSI/203/TTEP/4*	8	68	39	0	4313	BCD	36-70
981	DMSI/203/TTEP/4*	9	69	40	5	4307	BCD	34-71
980	DMSI/203/TTEP/4*	6	70	42	0	4240	BCD	43-70
982	TORO2	5	72	41	0	4225	BCD	52-67
973	DMSI//LMNT/NWBT/	7	71	51	25	4141	CD	63-72
986	DLMT/B8462T3-710	5	70	35	0	4125	CD	48-66
976	DMSI/DLLAX2//LMN	6	72	46	5	3947	DE	38-66
974	DMSI//LMNT/NWBT/	7	73	51	50	3933	DE	62-71
968	LMNT/TOR2	4	67	48	0	3927	DE	45-67
977	DMSI/DLLAX2//LMN	6	71	45	15	3898	DE	39-66
985	DLMT/B8462T3-710	4	67	33	0	3884	DE	55-70
972	DMSI//LMNT/NWBT/	8	72	49	30	3836	DE	62-72
961	DMSI//LMNT/NWBT/	6	68	40	0	3711	DE	44-67
975	DMSI/DLLAX2//LMN	6	72	44	30	3701	DE	37-66
990	LACASSINE	4	71	36	0	3674	DE	41-64
967	TOR2/LBNTX2	6	71	39	0	3649	DE	33-64
988	DELMONT	4	70	38	0	3235	EF	37-62
965	DMSI/DLLAX2//LMN	9	73	43	0	2753	FG	51-71
966	NWBT/LMNT(F6)//D	4	74	37	0	2449	GH	33-60
964	DMSI/DLLAX2//A30	4	75	56	0	2049	H	51-67
963	DMSI/DLLAX2//A30	5	73	49	0	1934	H	38-67
978	DMSI/DLLAX2//A30	3	74	50	0	1794	H	32-61
969	RED BRAN LONG	9	-	53	-	-		50-62
C.V.		15.1	1.4	4.5	-	9.3		10.2-1.4

* SUBJECTIVE RATING 1 TO 9, WHERE 1 = EXCELLENT, 9 = POOR.
** NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

MULTIPLE GENERATION RICE BREEDING NURSERY[1,2]

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A winter nursery facility is an essential and integral feature of a modern rice breeding program. The nursery allows the production of additional generations of breeding material per year, thus decreasing the amount of time required to develop new varieties. The winter nursery also permits an opportunity to practice disruptive selection in another environment and the growing of elite selections of germplasm not adapted to the Louisiana environment.

The Agricultural Experiment Station of Arkansas, Louisiana, Texas, and Puerto Rico have a cooperative agreement to operate a year around rice nursery on the University of Puerto Rico Experiment Station located at Lajas for the purpose of advancement and seed increase of breeding lines. This cooperative venture has made possible nursery facilities, equipment, and labor and is allowing these rice breeding programs to grow a large number of breeding lines to expedite the development and release of improved rice varieties for the southern U.S. rice growing area.

1991 Activities

A nursery planted in September 1990 was harvested in January 1991. This nursery contained 3,000 rows and included 29 F_2 populations, 600 breeding rows of advanced generations, and a 600-row increase of experimental medium grain LA 2214. A January 1991 nursery was planted and included turn-over material of the previous nursery, 8 small seed increases of advanced lines, and A 900-row increase of LA 2214. This nursery was harvested in May and the seed returned to Crowley for planting.

The fall 1991 nursery included 43 F_2 populations and 700 advanced breeding lines among the 3,000 rows. This nursery was harvested in January 1992 and much of the material was turned over in the following nursery planted in January 1992.

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[1] Cooperative investigators, Louisiana Agricultural Experiment Station, Crowley, LA; University of Puerto Rico Agricultural Experiment Station, Lajas, PR; Texas Agricultural Experiment Station and USDA-ARS, Beaumont, TX; and Arkansas Agricultural Experiment Station, Stuttgart, AR.

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TOLERANCE OF RICE VARIETIES AND EXPERIMENTAL LINES TO RICE HERBICIDES

D.E. Sanders, S.D. Linscombe, F. Jodari, and A.P. Fabacher

Some of the newer rice herbicides have shown differential phytotoxicity on rice genotypes. This study was conducted to provide information on which rice line/herbicide combinations may display sufficient phytotoxicity, delay in maturity, and/or yield reduction to warrant non-recommendation.

Experiment: Herbicide Tolerance Study

Location: Rice Research Station

Seeding Rate/Date: 100 lb/A, June 17, 1991

Planting Method: Drill-seeded

Fertilization: 50-50-50 (lb/A N-P_2O_5-K_2O) preplant incorporated, June 17;
75 lb N/A, July 7

Plot Size: 4.66 x 12 ft (56 ft^2)

Water Management: Flushed, June 17; flooded, July 9; harvest drainage, Sept 20

Rice Lines:

Alan	LA 2215	RT 7015
AS 3058	Lacassine	Rico 1
AS 3510	Lemont	Rosemont
Bengal	Mars	Skybonnet
Cypress	Maybelle	Texmont
Gulfmont	Mercury	TX 3072
Jasmine 85	Millie	V-4716
Katy	Orion	

Treatments: Applied July 2

1. Arrosolo 4.0 qt/A (3.0 lb ai/A propanil + 3.0 lb ai/A molinate)
2. Buctril+Stam 1.5 pt+3.0 qt/A (.375 lb ai/A bromoxymil + 3.0 lb ai/A propanil)
3. Stam 3.0 qt/A (3.0 lb ai/A propanil)
4. Rely + Stam 1.0 pt + 3.0 qt/A (.375 lb ai/A triclopyr + 3.0 lb ai/A propanil)
5. Facet 1.0 lb/A (.5 lb ai/A quinclorac)
6. Whip 1.6 pt/A (.2 lb ai/A fenoxyprop)
7. Poast 13 oz/A (.15 lb ai/A sethoxydim)
8. Check

Insecticides: Furadan (carbofuran) 0.6 lb ai/A, July 19

Harvest: Sept 29-30, Oct 1

Experimental Design: Split plot in randomized complete block design with three replications; herbicide treatments assigned to main plots and rice line to subplots.

Comments: Tables 1-23 contain yield and agronomic data for each rice line x herbicide combination. Several herbicide combinations caused significant yield reductions when compared with the check for some rice lines. Overall, yields were reduced because of late planting and rotten neck blast disease.

TABLE 1. TOLERANCE OF 'ALAN' TO RICE HERBICIDES. RICE RESEARCH STATION, CROWLEY, LA. 1991.

HERBICIDE	VARIETY	DAYS TO 50% HEADING	PLANT HEIGHT (IN)	YIELD (LB/A @ 12%)	DUNCANS TEST*
WHIP 1.6 PT	ALAN	67	37	4493	A
CHECK	ALAN	63	41	4404	A
RELY + STAM	ALAN	65	38	4374	A
ARROSOLO 4 QT	ALAN	63	39	4328	A
BUCTRIL + STAM	ALAN	63	40	4215	A
FACET 1.0 LB	ALAN	63	40	4154	A
STAM 3 QT	ALAN	65	40	3812	A
POAST 13 OZ	ALAN	70	40	3077	B
C.V.		2.7	6.5	11.2	

* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 2. TOLERANCE OF 'AS 3058' TO RICE HERBICIDES. RICE RESEARCH STATION, CROWLEY, LA. 1991.

HERBICIDE	VARIETY	DAYS TO 50% HEADING	PLANT HEIGHT (IN)	YIELD (LB/A @ 12%)	DUNCANS TEST*
RELY + STAM	AS 3058	69	41	3614	A
CHECK	AS 3058	72	47	3055	AB
ARROSOLO 4 QT	AS 3058	71	40	3015	AB
STAM 3 QT	AS 3058	70	45	2960	AB
FACET 1.0 LB	AS 3058	71	47	2919	AB
WHIP 1.6 PT	AS 3058	73	42	2792	B
BUCTRIL + STAM	AS 3058	70	46	2581	B
POAST 13 OZ	AS 3058	71	39	2575	B
C.V.		2.7	6.5	11.2	

* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 3. TOLERANCE OF 'AS 3510' TO RICE HERBICIDES. RICE RESEARCH STATION, CROWLEY, LA. 1991.

HERBICIDE	VARIETY	DAYS TO 50% HEADING	PLANT HEIGHT (IN)	YIELD (LB/A @ 12%)	DUNCANS TEST*
POAST 13 OZ	AS 3510	56	37	2947	A
WHIP 1.6 PT	AS 3510	55	38	2564	AB
BUCTRIL + STAM	AS 3510	48	39	2245	ABC
ARROSOLO 4 QT	AS 3510	48	40	2174	BC
RELY + STAM	AS 3510	48	36	2084	BC
CHECK	AS 3510	48	38	2051	BC
STAM 3 QT	AS 3510	48	39	1899	BC
FACET 1.0 LB	AS 3510	48	37	1673	C
C.V.		2.7	6.5	11.2	

* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 4. TOLERANCE OF 'BENGAL' TO RICE HERBICIDES. RICE RESEARCH STATION, CROWLEY, LA. 1991.

HERBICIDE	VARIETY	DAYS TO 50% HEADING	PLANT HEIGHT (IN)	YIELD (LB/A @ 12%)	DUNCANS TEST*
BUCTRIL + STAM	BENGAL	69	38	4049	A
RELY + STAM	BENGAL	69	38	3733	AB
CHECK	BENGAL	70	36	3628	AB
STAM 3 QT	BENGAL	70	36	3591	AB
ARROSOLO 4 QT	BENGAL	70	37	3562	AB
FACET 1.0 LB	BENGAL	70	38	3252	BC
POAST 13 OZ	BENGAL	72	34	2737	C
WHIP 1.6 PT	BENGAL	71	36	2619	C
C.V.		2.7	6.5	11.2	

* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 5. TOLERANCE OF 'CYPRESS' TO RICE HERBICIDES. RICE RESEARCH STATION, CROWLEY, LA. 1991.

HERBICIDE	VARIETY	DAYS TO 50% HEADING	PLANT HEIGHT (IN)	YIELD (LB/A @ 12%)	DUNCANS TEST*
BUCTRIL + STAM	CYPRESS	69	40	5055	A
CHECK	CYPRESS	69	38	4747	AB
ARROSOLO 4 QT	CYPRESS	70	39	4553	ABC
STAM 3 QT	CYPRESS	76	39	4481	ABC
FACET 1.0 LB	CYPRESS	71	39	4195	BC
WHIP 1.6 PT	CYPRESS	72	39	4171	BC
RELY + STAM	CYPRESS	71	41	3964	C
POAST 13 OZ	CYPRESS	77	38	2065	D
C.V.		2.7	6.5	11.2	

* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 6. TOLERANCE OF 'GULFMONT' TO RICE HERBICIDES. RICE RESEARCH STATION, CROWLEY, LA. 1991.

HERBICIDE	VARIETY	DAYS TO 50% HEADING	PLANT HEIGHT (IN)	YIELD (LB/A @ 12%)	DUNCANS TEST*
CHECK	GULFMONT	71	42	4467	A
WHIP 1.6 PT	GULFMONT	71	37	3838	AB
ARROSOLO 4 QT	GULFMONT	70	37	3821	AB
STAM 3 QT	GULFMONT	70	41	3803	AB
BUCTRIL + STAM	GULFMONT	70	40	3752	AB
FACET 1.0 LB	GULFMONT	71	39	3743	AB
RELY + STAM	GULFMONT	72	37	3563	B
POAST 13 OZ	GULFMONT	79	37	2804	C
C.V.		2.7	6.5	11.2	

* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 7. TOLERANCE OF 'JASMINE 85' TO RICE HERBICIDES. RICE RESEARCH STATION, CROWLEY, LA. 1991.

HERBICIDE	VARIETY	DAYS TO 50% HEADING	PLANT HEIGHT (IN)	YIELD (LB/A @ 12%)	DUNCANS TEST*
BUCTRIL + STAM	JASMINE 85	81	46	4241	A
RELY + STAM	JASMINE 85	81	42	4080	AB
WHIP 1.6 PT	JASMINE 85	82	44	3796	AB
ARROSOLO 4 QT	JASMINE 85	82	43	3791	AB
CHECK	JASMINE 85	83	42	3578	ABC
STAM 3 QT	JASMINE 85	82	45	3436	BC
FACET 1.0 LB	JASMINE 85	83	47	2991	C
POAST 13 OZ	JASMINE 85	89	37	1008	D
C.V.		2.7	6.5	11.2	

* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 8. TOLERANCE OF 'KATY' TO RICE HERBICIDES. RICE RESEARCH STATION, CROWLEY, LA. 1991.

HERBICIDE	VARIETY	DAYS TO 50% HEADING	PLANT HEIGHT (IN)	YIELD (LB/A @ 12%)	DUNCANS TEST*
CHECK	KATY	70	43	4333	A
ARROSOLO 4 QT	KATY	70	44	4300	A
BUCTRIL + STAM	KATY	71	46	4206	A
STAM 3 QT	KATY	70	43	4190	A
WHIP 1.6 PT	KATY	70	45	4103	A
FACET 1.0 LB	KATY	72	47	3999	A
RELY + STAM	KATY	70	45	3912	A
POAST 13 OZ	KATY	76	43	3574	A
C.V.		2.7	6.5	11.2	

* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 9. TOLERANCE OF 'LA 2215' TO RICE HERBICIDES. RICE RESEARCH STATION, CROWLEY, LA. 1991.

HERBICIDE	VARIETY	DAYS TO 50% HEADING	PLANT HEIGHT (IN)	YIELD (LB/A @ 12%)	DUNCANS TEST*
BUCTRIL + STAM	LA 2215	68	33	4675	A
CHECK	LA 2215	68	35	4623	A
ARROSOLO 4 QT	LA 2215	68	36	4370	AB
RELY + STAM	LA 2215	68	36	4308	AB
FACET 1.0 LB	LA 2215	69	35	4270	AB
STAM 3 QT	LA 2215	68	34	4100	ABC
WHIP 1.6 PT	LA 2215	70	33	3834	BC
POAST 13 OZ	LA 2215	73	35	3462	C
C.V.		2.7	6.5	11.2	

* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 10. TOLERANCE OF 'LACASSINE' TO RICE HERBICIDES. RICE RESEARCH STATION, CROWLEY, LA. 1991.

HERBICIDE	VARIETY	DAYS TO 50% HEADING	PLANT HEIGHT (IN)	YIELD (LB/A @ 12%)	DUNCANS TEST*
CHECK	LACASSINE	69	38	4165	A
STAM 3 QT	LACASSINE	69	37	4109	A
BUCTRIL + STAM	LACASSINE	69	36	4062	A
ARROSOLO 4 QT	LACASSINE	70	38	3953	AB
RELY + STAM	LACASSINE	69	35	3719	AB
WHIP 1.6 PT	LACASSINE	72	37	3535	AB
FACET 1.0 LB	LACASSINE	71	39	3403	AB
POAST 13 OZ	LACASSINE	77	37	3214	B
C.V.		2.7	6.5	11.2	

* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 11. TOLERANCE OF 'LEMONT' TO RICE HERBICIDES. RICE RESEARCH STATION, CROWLEY, LA. 1991.

HERBICIDE	VARIETY	DAYS TO 50% HEADING	PLANT HEIGHT (IN)	YIELD (LB/A @ 12%)	DUNCANS TEST*
BUCTRIL + STAM	LEMONT	71	38	4101	A
CHECK	LEMONT	71	36	3960	A
ARROSOLO 4 QT	LEMONT	71	40	3807	A
FACET 1.0 LB	LEMONT	73	39	3751	A
STAM 3 QT	LEMONT	71	39	3712	A
RELY + STAM	LEMONT	73	38	3676	A
WHIP 1.6 PT	LEMONT	75	37	2979	B
POAST 13 OZ	LEMONT	77	38	2821	B
C.V.		2.7	6.5	11.2	

* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 12. TOLERANCE OF 'MARS' TO RICE HERBICIDES. RICE RESEARCH STATION, CROWLEY, LA. 1991.

HERBICIDE	VARIETY	DAYS TO 50% HEADING	PLANT HEIGHT (IN)	YIELD (LB/A @ 12%)	DUNCANS TEST*
BUCTRIL + STAM	MARS	70	43	3998	A
STAM 3 QT	MARS	70	41	3982	A
ARROSOLO 4 QT	MARS	71	43	3936	A
CHECK	MARS	70	42	3919	A
RELY + STAM	MARS	70	41	3873	A
FACET 1.0 LB	MARS	71	40	3651	A
WHIP 1.6 PT	MARS	71	41	3540	A
POAST 13 OZ	MARS	73	42	3316	A
C.V.		2.7	6.5	11.2	

* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 13. TOLERANCE OF 'MAYBELLE' TO RICE HERBICIDES. RICE RESEARCH STATION, CROWLEY, LA. 1991.

HERBICIDE	VARIETY	DAYS TO 50% HEADING	PLANT HEIGHT (IN)	YIELD (LB/A @ 12%)	DUNCANS TEST*
RELY + STAM	MAYBELLE	60	40	4232	A
STAM 3 QT	MAYBELLE	57	36	3877	AB
BUCTRIL + STAM	MAYBELLE	57	36	3774	ABC
ARROSOLO 4 QT	MAYBELLE	58	39	3764	ABC
CHECK	MAYBELLE	57	37	3547	ABC
WHIP 1.6 PT	MAYBELLE	61	34	3483	BC
FACET 1.0 LB	MAYBELLE	58	36	3381	BC
POAST 13 OZ	MAYBELLE	69	35	3025	C
C.V.		2.7	6.5	11.2	

* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 14. TOLERANCE OF 'MERCURY' TO RICE HERBICIDES. RICE RESEARCH STATION, CROWLEY, LA. 1991.

HERBICIDE	VARIETY	DAYS TO 50% HEADING	PLANT HEIGHT (IN)	YIELD (LB/A @ 12%)	DUNCANS TEST*
CHECK	MERCURY	74	35	3657	A
RELY + STAM	MERCURY	69	40	3618	A
STAM 3 QT	MERCURY	69	35	3450	AB
ARROSOLO 4 QT	MERCURY	70	35	3283	AB
BUCTRIL + STAM	MERCURY	69	34	3274	AB
POAST 13 OZ	MERCURY	70	36	3141	AB
FACET 1.0 LB	MERCURY	71	36	2765	BC
WHIP 1.6 PT	MERCURY	71	37	2384	C
C.V.		2.7	6.5	11.2	

* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 15. TOLERANCE OF 'MILLIE' TO RICE HERBICIDES. RICE RESEARCH STATION, CROWLEY, LA. 1991.

HERBICIDE	VARIETY	DAYS TO 50% HEADING	PLANT HEIGHT (IN)	YIELD (LB/A @ 12%)	DUNCANS TEST*
STAM 3 QT	MILLIE	62	42	6057	A
FACET 1.0 LB	MILLIE	66	42	5773	AB
BUCTRIL + STAM	MILLIE	62	42	5716	AB
CHECK	MILLIE	62	42	5591	AB
RELY + STAM	MILLIE	64	39	5404	AB
ARROSOLO 4 QT	MILLIE	63	41	5076	BC
WHIP 1.6 PT	MILLIE	67	39	4523	C
POAST 13 OZ	MILLIE	71	38	2715	D
C.V.		2.7	6.5	11.2	

* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 16. TOLERANCE OF 'ORION' TO RICE HERBICIDES. RICE RESEARCH STATION, CROWLEY, LA. 1991.

HERBICIDE	VARIETY	DAYS TO 50% HEADING	PLANT HEIGHT (IN)	YIELD (LB/A @ 12%)	DUNCANS TEST*
CHECK	ORION	69	43	4830	A
ARROSOLO 4 QT	ORION	70	42	4625	A
BUCTRIL + STAM	ORION	70	43	4532	A
WHIP 1.6 PT	ORION	70	39	4519	A
STAM 3 QT	ORION	69	43	4390	AB
RELY + STAM	ORION	69	40	4319	AB
FACET 1.0 LB	ORION	71	41	3724	B
POAST 13 OZ	ORION	71	39	3635	B
C.V.		2.7	6.5	11.2	

* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 17. TOLERANCE OF 'RT 7015' TO RICE HERBICIDES. RICE RESEARCH STATION, CROWLEY, LA. 1991.

HERBICIDE	VARIETY	DAYS TO 50% HEADING	PLANT HEIGHT (IN)	YIELD (LB/A @ 12%)	DUNCANS TEST*
RELY + STAM	RT 7015	64	37	4129	A
STAM 3 QT	RT 7015	66	31	4074	A
CHECK	RT 7015	71	33	3977	A
BUCTRIL + STAM	RT 7015	63	32	3953	A
WHIP 1.6 PT	RT 7015	68	32	3750	A
FACET 1.0 LB	RT 7015	67	33	3696	A
ARROSOLO 4 QT	RT 7015	65	34	3636	A
POAST 13 OZ	RT 7015	70	35	2817	B
C.V.		2.7	6.5	11.2	

* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 18. TOLERANCE OF 'RICO 1' TO RICE HERBICIDES. RICE RESEARCH STATION, CROWLEY, LA. 1991.

HERBICIDE	VARIETY	DAYS TO 50% HEADING	PLANT HEIGHT (IN)	YIELD (LB/A @ 12%)	DUNCANS TEST*
RELY + STAM	RICO 1	71	40	4078	A
BUCTRIL + STAM	RICO 1	71	42	3939	A
ARROSOLO 4 QT	RICO 1	71	41	3807	A
WHIP 1.6 PT	RICO 1	72	41	3779	A
CHECK	RICO 1	71	41	3754	A
POAST 13 OZ	RICO 1	76	38	3628	A
STAM 3 QT	RICO 1	72	43	3623	A
FACET 1.0 LB	RICO 1	72	41	3327	A
C.V.		2.7	6.5	11.2	

* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 19. TOLERANCE OF 'ROSEMONT' TO RICE HERBICIDES. RICE RESEARCH STATION, CROWLEY, LA. 1991.

HERBICIDE	VARIETY	DAYS TO 50% HEADING	PLANT HEIGHT (IN)	YIELD (LB/A @ 12%)	DUNCANS TEST*
BUCTRIL + STAM	ROSEMONT	63	32	3513	A
STAM 3 QT	ROSEMONT	63	31	3391	A
WHIP 1.6 PT	ROSEMONT	68	30	3352	A
CHECK	ROSEMONT	63	34	3309	A
FACET 1.0 LB	ROSEMONT	63	33	3180	A
ARROSOLO 4 QT	ROSEMONT	64	35	3065	A
POAST 13 OZ	ROSEMONT	70	34	2847	A
RELY + STAM	ROSEMONT	63	36	2814	A
C.V.		2.7	6.5	11.2	

* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 20. TOLERANCE OF 'SKYBONNET' TO RICE HERBICIDES. RICE RESEARCH STATION, CROWLEY, LA. 1991.

HERBICIDE	VARIETY	DAYS TO 50% HEADING	PLANT HEIGHT (IN)	YIELD (LB/A @ 12%)	DUNCANS TEST*
STAM 3 QT	SKYBONNET	67	44	4813	A
CHECK	SKYBONNET	67	45	4782	A
RELY + STAM	SKYBONNET	68	41	4744	A
BUCTRIL + STAM	SKYBONNET	67	44	4682	A
ARROSOLO 4 QT	SKYBONNET	67	46	4532	A
WHIP 1.6 PT	SKYBONNET	68	44	4380	A
FACET 1.0 LB	SKYBONNET	70	46	4273	A
POAST 13 OZ	SKYBONNET	73	44	3379	B
C.V.		2.7	6.5	11.2	

* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 21. TOLERANCE OF 'TEXMONT' TO RICE HERBICIDES. RICE RESEARCH STATION, CROWLEY, LA. 1991.

HERBICIDE	VARIETY	DAYS TO 50% HEADING	PLANT HEIGHT (IN)	YIELD (LB/A @ 12%)	DUNCANS TEST*
STAM 3 QT	TEXMONT	61	33	3482	A
WHIP 1.6 PT	TEXMONT	67	30	3359	A
BUCTRIL + STAM	TEXMONT	62	33	3174	A
CHECK	TEXMONT	62	34	3166	A
ARROSOLO 4 QT	TEXMONT	62	35	3033	AB
FACET 1.0 LB	TEXMONT	63	32	3033	AB
RELY + STAM	TEXMONT	62	37	2965	AB
POAST 13 OZ	TEXMONT	71	33	2356	B
C.V.		2.7	6.5	11.2	

* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 22. TOLERANCE OF 'TX 3072' TO RICE HERBICIDES. RICE RESEARCH STATION, CROWLEY, LA. 1991.

HERBICIDE	VARIETY	DAYS TO 50% HEADING	PLANT HEIGHT (IN)	YIELD (LB/A @ 12%)	DUNCANS TEST*
BUCTRIL + STAM	TX 3072	68	34	5103	A
ARROSOLO 4 QT	TX 3072	69	36	4689	AB
STAM 3 QT	TX 3072	68	35	4651	AB
RELY + STAM	TX 3072	69	36	4616	AB
CHECK	TX 3072	68	35	4579	AB
FACET 1.0 LB	TX 3072	69	38	4503	AB
WHIP 1.6 PT	TX 3072	70	36	4268	B
POAST 13 OZ	TX 3072	75	34	3170	C
C.V.		2.7	6.5	11.2	

* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

TABLE 23 TOLERANCE OF 'V 4716' TO HERBICIDES. RICE RESEARCH STATION, CROWLEY, LA. 1991.

HERBICIDE	VARIETY	DAYS TO 50% HEADING	PLANT HEIGHT (IN)	YIELD (LB/A @ 12%)	DUNCANS TEST*
BUCTRIL + STAM	V 4716	69	34	4065	A
ARROSOLO 4 QT	V 4716	71	36	4019	A
RELY + STAM	V 4716	70	34	3925	A
CHECK	V 4716	70	38	3858	A
STAM 3 QT	V 4716	70	36	3717	A
WHIP 1.6 PT	V 4716	71	34	3674	A
FACET 1.0 LB	V 4716	72	37	3370	A
POAST 13 OZ	V 4716	75	33	1804	B
C.V.		2.7	6.5	11.2	

* NUMBERS FOLLOWED BY THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT AT THE 0.05 LEVEL.

SPECIAL PURPOSE RICE BREEDING

F. Jodari, S.D. Linscombe, and K. Cadwallader

Demand for certain special purpose rice varieties is increasing as the consumption and market for these types in the US continues to expand. The objectives of this project is to develop specialty rice varieties that are adapted to Louisiana environment and possess superior agronomic, milling, quality, and specific specialty characters. The major emphasis is being placed on Jasmine, Della, Basmati, and waxy types.

Specialty breeding efforts in 1991 included evaluation of 190 specialty accessions from the world collection that were grown in the breeding nursery. Selections from these accessions were included in the hybridization block to be used in the crossing program.

A total of 63 crosses with at least one specialty parent were made in the summer of 1991. The specialty nursery included 52 F_1 populations, 18 F_2 bulk populations, 4,000 progeny rows, and 1,600 anther culture-derived breeding rows.

The results of preliminary yield tests of a total of 105 specialty breeding lines are shown in Tables 39, 40, 41, and 44 on pages 64, 65, 66, and 70. Agronomic practices used for these trials were the same as other preliminary yield trials explained earlier in the general breeding section. A combination of various specialty and cooking types was included in these trials. A considerable number of entries were Della type aromatic lines, with both high and low amylose contents. Included also were a number of entries with Domsia (a Basmati type) parentage which have both elongation and aroma characters. Some of the same sister lines are only elongating and have shown extreme elongation ratios similar to imported basmati. The agronomic and milling characters of a number of these lines compare favorably with the southern US long-grain varieties. Eight entries from this group will be included in the uniform regional nursery in 1992. Certain entries, such as 976, have shown excellent aroma and elongation ratio; however, their agronomic qualities did not compare favorably with the US long-grain varieties. Backcrossing and multiple crossing with these lines will be carried out to improve their overall qualities. A large number of these lines are anther culture-derived homozygous lines and are suitable for use in the crossing program.

A cooperative project was established in 1991 between the Rice Breeding program and the Food Science Department to analyze and quantify the aroma compound in rice varieties and experimental lines. This compound, which is identified as 2 acetyl-1-pyrroline, has shown to be strongly correlated with the popcorn-like or nutty aroma ratings sensed in rice. The results of a preliminary analysis of the aroma compound in selected entries are shown in Table 2. Fairly wide differences were found among entries. It is not clear at this point whether such differences have environmental or genetic sources. Further studies in this area will continue in 1992. These results combined with taste tests can have a large impact in the understanding of aroma inheritance and variation causes in rice, as well as being a valuable selection tool in specialty rice breeding.

Table 1. Concentration of 2 Acetyl-1-pyrroline in milled rice of selected specialty lines from 1991 preliminary yield trials. 1991. Food Science Department, Baton Rouge, LA.

Entry	Pedigree	Concentration
		------------PPB-------
846	LMNT/DLLA(2152)	380.1 (+- 6.2%)
850	DELMONT	450.1 (+- 1.0%)
838	DMSI//LMNT/NW	9.6
837	DMSI//LMNT/NW	488.7 (+- 4.9%)
839	DMSI//LMNT/NW	591.7 (+- 8.3%)
859	DMSI/DLLAX2/	551.0 (+- 9.2%)
863	DMSI/DLLAX2/	350.9 (+- 2.4%)
871	DMSI/DLLAX2/	303.5 (+-10.6%)
870	DMSI/DLLAX2/	287.0 (+- 9.4%)
872	DMSI/DLLAX2/	13.7
875	DELLA	755.9 (+- 1.8%)
900	LEMONT	12.7
899	JASMINE	676.1 (+- 1.8%)
878	DMSI/DLLAX2/	20.0
886	DMSI/DLLAX2/	347.2 (+- 7.1%)
885	DMSI/DLLAX2/	412.0 (+- 4.0%)
892	DMSI/203/TETE	TRACE
881	DMSI/DLLAX2/	487.5 (+- 0.6%)
898	A301	409.0 (+- 0.4%)
971	DMSI//LMNT/NWBT/	9.5
979	DMSI/203/TTEP/4*	437.5 (+- 1.2%)
983	DMSI/203/TTEP/4*	18.7
984	DMSI/203/TTEP/4*	86.8
981	DMSI/203/TTEP/4*	23.1
980	DMSI/203/TTEP/4*	13.6
986	DLMT/B8462T3-710	434.8 (+- 7.4%)
976	DMSI/DLLAX2//LMNT	895.8 (+- 8.1%)
977	DMSI/DLLAX2//LMNT	704.0 (+- 6.1%)
985	DLMT/B8462T3-710	419.1 (+- 6.8%)
011	LMNT/DLLA	20.5
085	LMNT/DLLA	792.7 (+- 9.3%)

GRAIN FISSURING AND MILLING YIELDS OF CURRENT RICE VARIETIES AS AFFECTED BY HARVEST MOISTURE

F. Jodari and S.D. Linscombe

Milling qualities of newly released rice varieties, advanced experimentals, and breeding lines are being continuously evaluated at the Rice Research Station. This information is used for screening and selecting breeding lines with superior milling qualities. The objectives of this study were to determine the relationships between the amount of fissured grain and head rice yield for each variety at decreasing harvest moistures.

Seven entries were tested in 1991, using a randomized complete block design and four replications. Varieties included 'L202,' 'Tebonnet,' 'Lacassine,' 'Lemont,' and 'Leah.' Experimental lines were LA 2207 (released as 'Cypress') and LA 2214 (released as 'Bengal'). Entries were drill seeded at a 100 lb/A rate. Experimental plots were 5' wide and 25' long. All agronomic practices used were similar to preliminary yield tests described earlier for 1991. At maturity, a 3 x 4 square foot area of each plot was harvested for milling and fissuring measurements at time intervals. Sampling was initiated when grain moisture had reached 28%. Subsequent samples were taken at 2- to 3-day intervals until grain moisture decreased to about 12%. In contrast to 1990, the test period in August 1991 coincided with alternating showers, saturated relative humidities, and drying conditions. This was inducive to grain fissuring at harvest and provided conditions for obtaining a wider range of information on each genotype.

Samples were threshed in the field and taken to the lab for harvest moisture measurements. After slowly drying the rough rice samples to 12% moisture, milling yields were determined using standard milling procedures. One hundred mature rough rice kernels were hand shelled at each harvest to determine the percentage of fissured grain. Fissured grain counts after milling were measured. Hourly relative humidity and rainfall data during the test period were also recorded. Regression, correlation, and covariance analyses were carried out for varieties individually and combined.

Differences in the weather conditions between 1990 and 1991 resulted in a somewhat different response by the varieties to decreasing harvest moistures. Correlations between harvest moisture and head rice yield were higher for Lemont, Leah, Tebonnet, and Bengal than others (Table 1). This is an indication of the susceptibility of these varieties to fissuring. No significant correlation was found between harvest moisture and head rice yield for Cypress and Lacassine. A high negative correlation between fissured grain and head rice yield for Lemont, Lacassine, Leah, and Bengal indicates that fissured grains account for most of the reduction in the head rice yield among these varieties. These results, in general, are in agreement with the data obtained in 1990.

Table 1. Correlations between harvest moisture (HM), head rice (HR), and fissured grain (FG). Rice Research Station, Crowley, LA. 1991.

Entry	HM X HR	HM X FG	FG X HR
Lemont	0.42*	-0.77**	-0.86**
Lacassine	0.35	-0.70**	-0.78**
LA 2207	-0.31	-0.65**	-0.41*
Leah	0.89**	-0.87**	-0.89**
Tebonnet	-0.45**	-0.73**	-0.20
L202	-0.41*	-0.71**	0.10
LA 2214	0.68**	-0.77**	-0.92**

* Significant probability of Pearson correlations at 0.05 (*) and 0.01 (**) level.

Relationships between harvest moisture, grain fissuring, and head rice yield for each variety are shown in Figures 1 and 2. Considerable reductions in head rice yield were observed at harvest moistures below 20%, with the exception of Tebonnet, Cypress, and L202. Development of fissures at decreasing harvest moistures corresponded well with the declining head rice yield for each variety. Cypress maintained a superior milling yield over a wide range of harvest moistures. This was evident by relatively low increase in fissured grain (<20%) at the lowest harvest moisture (13%). Lemont, on the other hand, showed a narrow range of optimum harvest moisture. Fissuring in Lemont sharply increased at harvest moistures below 21%. Fissured grains in this variety increased to 62% as harvest moisture decreased to 13%.

A covariance analysis showed no significant differences in the regression coefficients between fissured grain and head rice yield for most varieties except L202 and Tebonnet, where no significant regression relation was found (Figure 3). These results were also in agreement with 1990 data, indicating that head rice yield reductions due to presence of fissured grains can be predicted regardless of the variety.

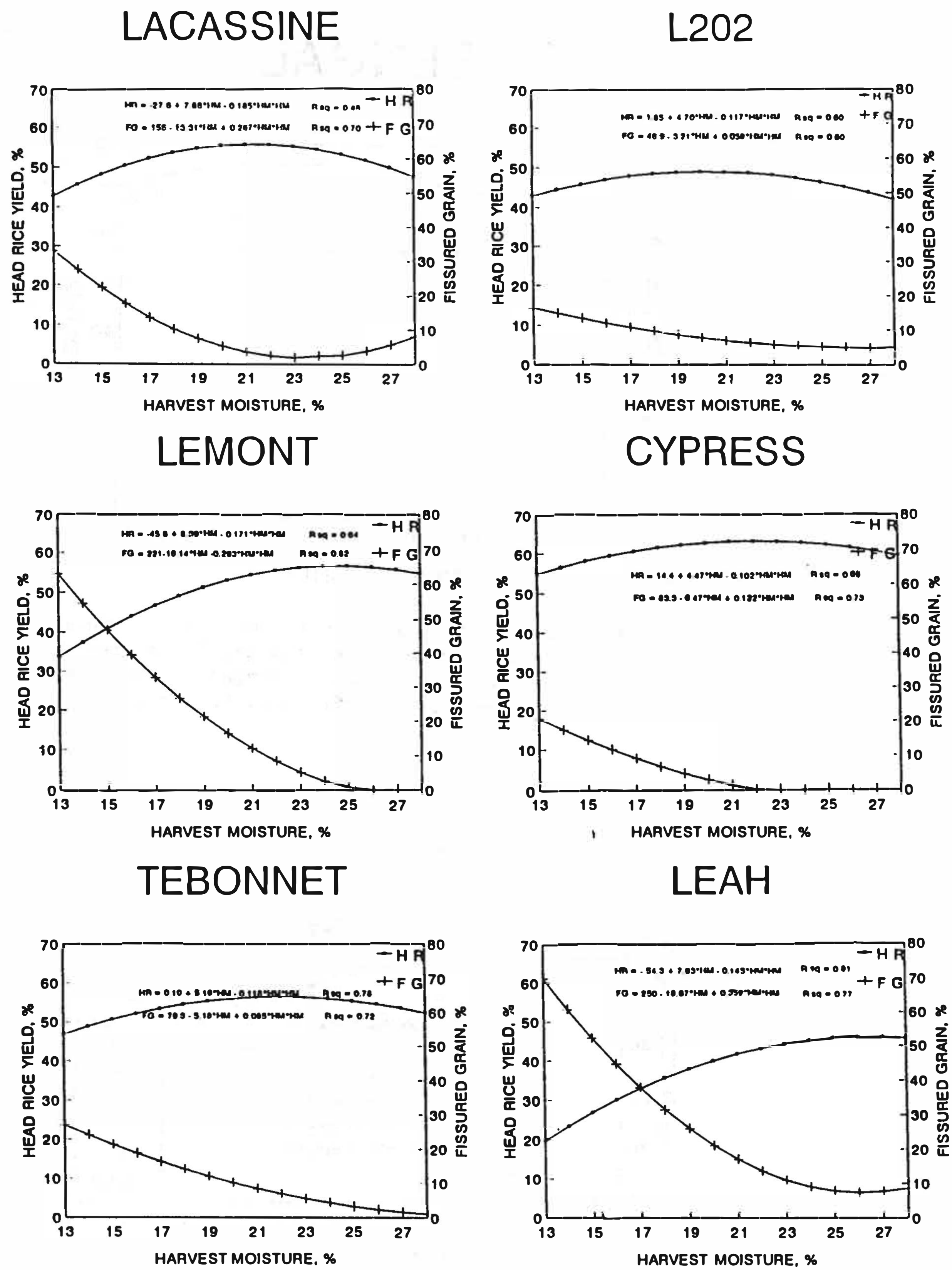

Figure 1. Relationship between harvest moisture, grain fissuring, and head rice yields among long-grain rice varieties. Rice Research Station, Crowley, LA. 1991.

BENGAL

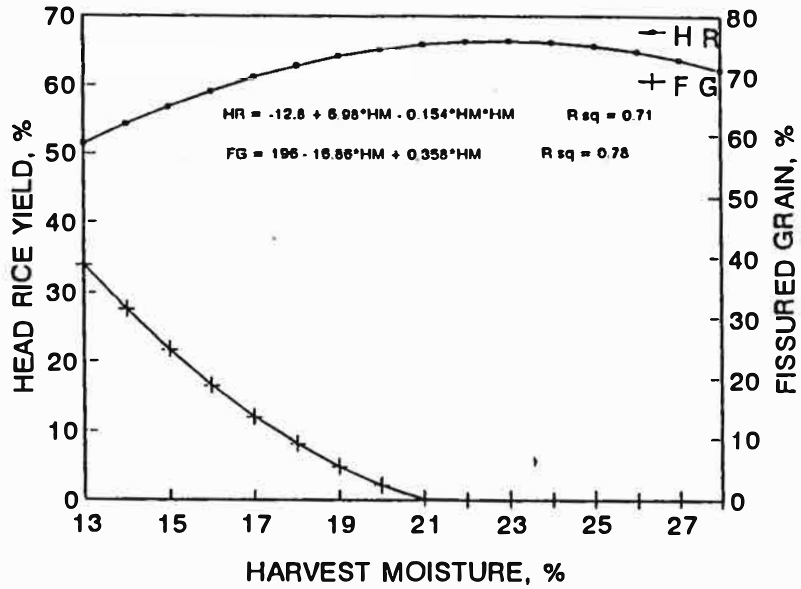

Figure 2. Relationship between harvest moisture, grain fissuring, and head rice yields among medium-grain Bengal variety. Rice Research Station, Crowley, LA. 1991.

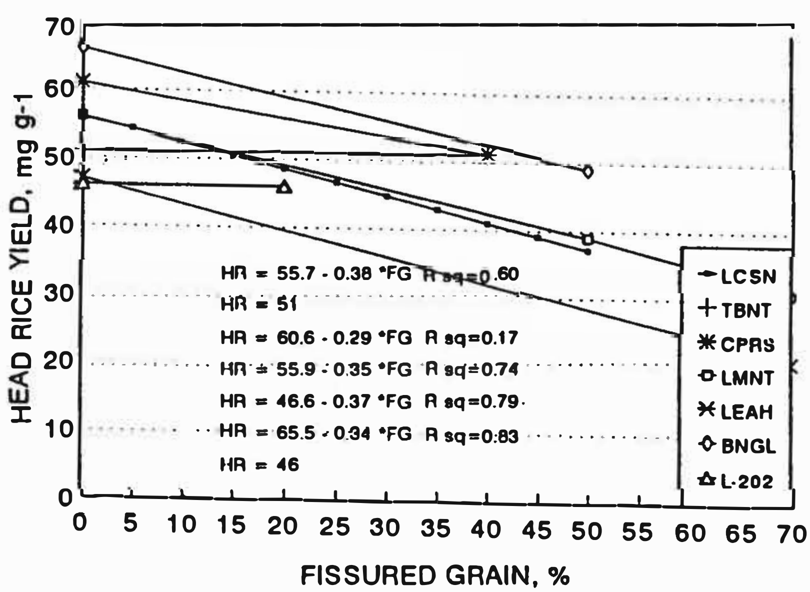

Figure 3. Relationship between head rice yields and fissured grain among varieties. Rice Research Station, Crowley, LA. 1991.

RICE AND WHEAT IMPROVEMENT THROUGH BIOTECHNOLOGY

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Nearly 530,000 rice anthers were plated from rice breeding project germplasm. A total of 118 genetic lines from the rice breeding program were utilized, consisting of 77 F_2 and 41 F_1 crosses. Approximately 6,000 new anther culture derived rice lines were planted in the field for evaluation. At maturity, breeding program personnel evaluated this material and selected superior lines for further testing. Wheat research included the plating of 37,000 anthers from wheat breeding program germplasm. Forty two new anther culture lines were developed through this effort and are currently in the field. Two media modifications were identified which were twice as efficient as those previously employed for anther culture of Louisiana wheat breeding program germplasm. A total of 1,927 somaclones were produced from the wheat varieties Savannah, Florida 302, ATW 270, McNair 1003, Andy, Coker 9323, and Coker 9105. 30 somaclonal lines previously developed from Coker 9877 were identified as male sterile, providing useful material for breeding use. Plots and rows from somaclones that showed promise in earlier evaluations were planted. This includes 3,331 lines planted in rows, 8 lines planted in single observation plots, and 10 lines planted in replicated yield plots.

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BIOTECHNOLOGY APPLICATIONS TO COASTAL EROSION CONTROL

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Coastal erosion causes losses of as much as 40 - 50 square miles a year in Louisiana. Applying biotechnology to improve the ability to utilize vegetation as a biological erosion control measure offers the potential to reduce erosion losses. The research program on coastal marsh species in the project focuses on the utilization of *Spartina alterniflora* in pursuit of this objective.

Modified laboratory protocols and 24 new nutrient media combinations have been evaluated for tissue culture of *Spartina alterniflora* during 1991. Media alterations have included variations in hormone concentrations and the addition of activated charcoal and casein hydrolysate as medium constituents. Plant explants utilized were immature panicles (1 to 10 cm in length), leaves, leaf sheaths, stems, and stem nodes. Modification of the procedure for propagating callus has indicated that the inclusion of explant material in the initial callus subculture may be beneficial in promoting callus growth.

RICE FERTILIZATION AND CULTURAL MANAGEMENT[1/]

EFFECT OF N RATE AND TIMING ON AGRONOMIC PERFORMANCE OF SELECTED RICE VARIETIES AND EXPERIMENTAL LINES IN LOUISIANA RICE PRODUCING AREAS

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and D.M. Walker

INTRODUCTION

Fertilizer nitrogen (N) is required on virtually all of the rice acreage in Louisiana for optimum production. Efficiency and uptake of applied N are influenced by factors such as placement, rate, and timing in relation to water management. Growing a suitable rice variety coupled with management practices that conserve applied N generally increase the chance of profitable rice production.

The placement and timing of fertilizer N are dependent upon the cultural system used. In Louisiana, rice is grown in water- and dry-seeded cultural systems. In the water-seeded, permanently flooded system, the optimum N rate should be placed 2 to 3 inches below the soil surface within 5 to 7 days of establishing the flood. In the dry-seeded system, the optimum N rate should be broadcast onto a dry soil surface prior to establishing the permanent flood. There is generally no advantage to applying multiple applications of fertilizer N in either cultural system provided there is precision in N application and placement and sound water management. Split applications may be desirable if the optimum N rate is not known, if the farmer is unfamiliar with a field, or if a variety is susceptible to lodging. When split applications are applied, it is important to apply an adequate amount of basal N to maintain the rice plant through tillering and into early reproductive growth. Generally, a split application consists of two-thirds of the estimated total N requirement applied preplant in water-seeded rice and preflood in dry-seeded rice, followed by a topdressing of the remaining one-third at either panicle initiation, panicle differentiation, or when deficiency symptoms appear.

Rice varieties may differ in their response to the amount and timing of applied N. Maximum or optimum yields of many varieties may occur over a wide range of N rates, depending on such factors as lodging, disease susceptibility, and inherent N utilization efficiency. Environmental influences, such as soil type, growing conditions, pest pressure, and weather, may affect

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1/ This research supported in part by funds provided by rice producers through the Louisiana Rice Research Board.

varietal performance. Conducting field research in the major rice producing areas of Louisiana provides valuable information for developing fertilization and management strategies for new varieties.

The objectives of these variety evaluations are to 1) determine yield potential and agronomic performance of new rice varieties and advanced experimental lines in different environments, and 2) determine the optimum N rate for each variety.

MATERIALS AND METHODS

Twenty-six rice varieties and/or advanced experimental lines were grouped by maturity for testing:

1. Very early: Tebonnet (TBNT), Maybelle (MBLE), Texmont (TXMT), Alan, Millie (MILL), Rosemont (RSMT), Jackson (JKSN), RT7015, AS 3510, 1001, 2031

2. Early: Lemont (LMNT), Katy, Mars, Rico 1 (RICO), Lacassine (LCSN), Orion (ORIN), Cypress (CPRS), Bengal (BNGL), 2146, 3072, Jasmine 85 (JSMN), Della (DLLA), Dellmont (DLMT), 2215, 3046

Tebonnet is a tall variety developed in Arkansas. It has very good yield potential but is susceptible to lodging. Maybelle is a very early maturing long-grain variety developed in Texas, and matures approximately 8 to 10 days earlier than Tebonnet. Maybelle is short in stature, possesses good straw strength, and has excellent second crop potential. Texmont is a semidwarf long-grain variety that was developed in Texas, has shown high yield potential, excellent ratooning ability, and matures earlier than Tebonnet. Alan and Millie are tall varieties developed in Arkansas and released in 1990. These varieties are somewhat more lodging resistant than Tebonnet and are earlier in maturity. Yield potential of these varieties also appears to be similar to that of Tebonnet. Rosemont is a semidwarf long grain developed in Texas and released in 1991. In limited testing, it has displayed good yield potential, ratooning ability, and is earlier than Tebonnet. Jackson was developed in Texas, is slightly taller and matures 7 to 10 days later than Maybelle, and is being tested for the first time. RT7015 was developed by RiceTec of Alvin, Texas and is also in the first year of testing. It is a semidwarf long grain that is similar to Tebonnet in maturity. AS 3510 is a short-stature long grain developed by Alexandria Seed Co. and matures 7 to 10 days earlier than Maybelle. Line 2031 is a semidwarf long grain developed in Louisiana and is in its initial year of testing. Line 1001 is a short-stature long grain developed in Arkansas that is also being tested for the first time. It matures 7 days earlier than Maybelle.

The early group includes the Texas semidwarf variety Lemont. Lemont has consistently shown excellent yield potential, is resistant to lodging, and responds well to high levels of fertilizer N. Katy was developed in Arkansas and is a tall long-grain variety that possesses good straw strength and stands well. Katy will lodge, however, if overfertilized. Its yield potential has consistently been less than that of Lemont. Lacassine is a semidwarf long grain released from Louisiana in 1991. It is very similar to Lemont in agronomic characteristics and has shown a slight yield advantage in both the first and second crop. Cypress, previously tested as line 2207, is a semidwarf long grain developed in Louisiana and has been released for 1992. Cypress has very good seedling vigor and tillering ability, with a slightly higher yield potential than the other semidwarf long grains. Line 2146 is a tall, long-grain entry developed in Louisiana and was tested for the first time in 1991. Line 3072 is a semidwarf long-grain entry developed in Texas and has been tested for the past two years. It is similar in yield potential to Lemont.

Mars is a tall, early season, medium-grain variety with good yield potential and was developed in Arkansas. It has excellent seedling vigor and good ratooning potential. Mars is lodging susceptible, especially at high rates of N fertilization. Rico 1 is a tall mid-season medium grain released from the breeding program in Texas. It is susceptible to lodging, but has higher yield potential than Mars and responds well to low rates of fertilizer N. The medium-grain variety Orion was released from Arkansas in 1991. It is a tall variety that has shown good yield potential in preliminary testing. First and second crop yield potential appear to be similar to that of Mars. Bengal is a medium grain developed in Louisiana and was released for 1992. It was previously tested as experimental line 2214. Bengal is a stiff-strawed semidwarf with good resistance to lodging. Yield potential is somewhat higher than that of Mars or Orion.

Jasmine 85 is a long-grain variety released from Texas in 1989. It is considered to be a special purpose rice, since it possesses aromatic properties and a low amylose content. Jasmine 85 has poor straw strength, is of medium height, and will lodge at high levels of N. Della is a tall, lodging-susceptible variety with the aromatic characteristic. Its yield potential is low in comparison with other long-grain varieties. Dellmont is an aromatic semidwarf long grain released from Texas in 1991. It is lodging resistant and has a much higher yield potential than Della. Line 2215, an advanced experimental developed in Louisiana, is a semidwarf long grain with the aromatic characteristic of Della. Line 3046 was developed in Texas and also possesses the aromatic characteristic of Della. It is a long-grain semidwarf with yield potential similar to that of Dellmont.

Varieties and advanced experimental lines were tested in five different locations; however, not all materials were included in each test. The aromatic varieties Della, Jasmine 85, Dellmont, and experimental lines 2215 and 3046 were tested at the Rice Research Station in a separate variety trial. Lemont was included in this evaluation for comparison purposes. Due to the very early maturity of experimental line 1001 and AS 3510, a separate evaluation was conducted for these entries at the Rice Research Station and compared only with Maybelle in a drill-seeded cultural system. All other experiments at the Rice Research Station and in Vermilion and Morehouse parishes were water-seeded. Evaluations at East Carroll and Rapides parishes were drill seeded. Entries were tested at four N rates, ranging from 60 to 150 lb/A in 30 lb/A increments, with N being applied as single applications.

Fertilizer N as ammonium sulfate was banded approximately 2 inches deep 1 to 2 days prior to flooding in the water-seeded experiments. In soils requiring P and K, approximately 60 lb/A P_2O_5 and K_2O were also banded. In drill-seeded experiments, basal N treatments were applied as a single broadcast application prior to establishment of the permanent flood.

Water-seeded experiments were seeded at the rate of 150 lb/A with presoaked seed. After 3 to 4 days, the experiments were drained briefly to promote seedling anchorage. A permanent flood was established 2 to 4 days after drainage, never allowing the soil to dry. In drill-seeded experiments, varieties were seeded at 100 lb/A and flushed periodically until the permanent flood was established (4 to 5 weeks after planting).

Pest control (weeds, insects, disease) was practiced when necessary. Individual whole plots were combine-harvested at field maturity. Days to 50% heading, plant height, lodging, grain moisture, and grain yield were measured.

Second crop data were generated in the Vermilion Parish and Rice Research Station variety evaluations. Following main crop harvest, 75 lb N/A were broadcast into the dry stubble, and a shallow flood was established within 2 to 3 days after N application. Individual whole plots were combine-harvested at field maturity. Grain moisture and grain yield were determined.

Plant growth stages were determined for all varieties at each location for use in updating or establishing predictions in the DD50 Rice Management Program (Tables 17-21).

SUMMARY AND CONCLUSIONS

Field experiments were conducted at the Rice Research Station and at four off-station locations to determine N response and agronomic performance of commercial varieties and advanced experimental lines when grown in different environments.

Agronomic data are shown in Tables 1-21. Results will be discussed by location.

The very early, drill-seeded evaluation at the Rice Research Station included Maybelle, AS 3510, and line 1001. All entries emerged within 7 days of planting. Line 1001 was affected by blast development and grain yields were reduced (Table 1). Maybelle and AS 3510 both required the maximum N rate of 150 lb/A, whereas no yield increase for line 1001 occurred beyond 90 lb N/A. Second crop yield for line 1001 was also much lower than the other entries (Table 2). Total grain yield for Maybelle was significantly higher than the other entries, and was due to an excellent second crop yield.

Seedling vigor was good to very good for all of the water-seeded, very early long-grain entries. Cool temperatures prevailed after planting; however, stand establishment was good for all entries. Tebonnet was the only entry that lodged significantly, especially at higher rates of N. Lodging was moderate for Alan when fertilized with 150 lb N/A with grain yield being reduced slightly. A rate of 90 to 120 lb N/A was required for optimum grain yields for most entries (Table 3). Grain yield of line 2031 and RT7015 continued to increase when fertilized up to 150 lb N/A. Second crop yields were excellent for all entries except Tebonnet. Total yields for Alan, Jackson, RT7015, and line 2031 were over 11,000 lb/A (Table 4).

Seedling vigor and rapid emergence were observed in the early test for the entries Mars, Katy, Cypress, Bengal, Orion, and 2146. Emergence was slow for the other entries. Lodging occurred in Rico 1, Mars, and Orion at N rates of 90 lb/A and above with grain yields being reduced significantly at 150 lb N/A (Table 5). Katy also lodged when fertilized with 150 lb N/A, and grain yield was reduced. Most entries required 90 to 120 lb N/A for optimum grain yields. Grain yields were above 8000 lb/A at optimum N for all entries except Katy. Second crop yields were also good but were decreased in entries where lodging in the main crop was severe (Table 6). Total grain yields for Lemont, Lacassine, Bengal, Cypress, and 3072 were over 11,000 lb/A.

Seedling vigor was good for the entries Dellmont and Della in the aromatic test and fair for the other entries. Lodging was severe for Della at rates of N above 60 lb/A, and for Jasmine 85 at 150 lb N/A (Table 7). Yields of these entries were decreased when lodged. Jasmine 85, Della, and 2215 required only 60 to 90 lb N/A for optimum yield while the other entries responded to higher rates. Second crop grain yield of Della was very low while the other entries produced excellent yields (Table 8). Total yields for all entries except Della were over 10,000 lb/A.

Variety tests in East Carroll Parish were drill seeded. Entries in the very early test emerged over a 6- to 7-day period. Stand establishment was good for all entries and rapid growth permitted N application and permanent flood establishment within 30 days of planting. Lodging occurred only in Tebonnet but did not affect grain yields (Table 9). Most entries required the highest rate of 150 lb N/A for optimum yield. Grain yields of Tebonnet, Alan, Rosemont, and 2031 were significantly higher than the other entries. Maybelle did not respond as well to increasing N as did the other entries, and the resulting grain yield was much lower.

Overall agronomic performance of the early group was slightly better than in the very early group. These entries also emerged rapidly, and the experiment was fertilized and permanently flooded within 30 days of planting. Lodging was insignificant and had no influence on grain yield (Table 10). Grain yields of all medium-grain entries were excellent, with Rico 1 yielding over 10,000 lb/A. Cypress and line 2146 were the highest yielding long-grain entries with grain yields above 8000 lb/A.

Variety tests in Vermilion Parish were water seeded. In the very early test, good to excellent seedling vigor was observed for all entries, except for Texmont and Tebonnet. Initial stand establishment was good for all entries; however, severe root pruning by the rice water weevil caused significant stand reduction. After control measures were taken to eliminate root pruning and a foliar zinc treatment was applied, the tillering and rapid plant growth that occurred resulted in an excellent stand. Disease problems during late vegetative and reproductive growth were severe and had a significant influence on grain yield. Late season weather problems also caused poor grain filling, and severe lodging of most entries contributed to decreased yields. All entries required an N application of 60 lb/A for optimum grain yields (Table 11), while higher N increased disease and lodging. While main crop yields were below average, second crop yields were good for all entries (Table 12). Total grain yields were highest for Rosemont, 2031, and RT7015.

Early season vigor and plant growth were also good in the early variety test for the entries Mars, Orion, Cypress, Bengal, Katy, and 2146. Seedling vigor of other entries was fair. The problems indicated in the very early test also had a similar influence on agronomic performance of all entries in this test. Only 60 lb N/A were required for optimum yields and additional fertilizer N resulted in significant yield reductions (Table 13). Second crop yields in this experiment averaged 600 lb/A less than in the very early yield trial (Table 14). Total grain yields were highest for Rico 1, Lacassine, and Bengal.

Agronomic data from the drill-seeded test in Rapides Parish are presented in Table 15. Emergence was somewhat slow with most entries requiring almost 2 weeks to emerge. Early season growth was good for most entries; however, the time required to reach 50% heading for these early entries was much longer than at the other locations. No lodging was observed in any entry. All entries in this test required the maximum of 150 lb N/A for optimum grain yield, indicating less efficient utilization of fertilizer N than at other locations. Sheath blight was present in this experiment but did not appear to significantly influence grain yields. The highest yielding entries at this location were medium grains and averaged over 5400 lb/A.

Emergence and early-season growth were generally good for the water-seeded, early entries in Morehouse Parish. Stands were very good and tillering was excellent. A significant amount of lodging occurred in Katy, Mars, Rico 1, Orion, and Bengal when fertilized with more than 60 lb N/A (Table 16). Lodging did cause some loss in grain yields at this location, especially where lodging began to occur at late heading. Grain yields were very good, with yields above 8000 lb/A for all entries except Katy. Lacassine, Bengal, and 2146 yielded over 8500 lb/A.

DD50 growth stage information is presented by entry and location in Tables 17 through 21.

Experiment: Very early variety x nitrogen trial

Location: Rice Research Station

Soil Type/Analysis: Crowley silt loam; pH: 6.1; O.M.: 1.02%; extractable nutrients (mg/kg): P-37, Na-71, K-86, Ca-1175, Mg-253, Zn-1.74, S-6.06, As-2.70, Fe-72.99

Variety/Seeding Rate: MBLE, AS 3510, 1001, 100 lb/A

Planting Method/Date: Drill-seeded, Apr 9

Fertilization: 60 lb/A P_2O_5 and K_2O ppi; N source, ammonium sulfate; second crop, 75 lb N/A

Plot Size: 7 x 25 ft (175 ft^2)

Emergence Date: MBLE, Apr 16; AS 3510, 1001, Apr 17

Water Management: Flushed, Apr 23; flooded, May 13; harvest drainage, July 26; second crop flooded, Aug 6; harvest drainage, Oct 11

Herbicides: 3.5 lb ai/A Stam (propanil), May 1; 3.0 lb ai/A Ordram (molinate), May 20; 0.9 oz ai/A Londax (bensulfuron-methyl), May 22

Insecticides: 0.6 lb ai/A Furadan (carbofuran), May 31

Fungicides: 0.5 lb ai/A Benlate (benomyl), June 17, July 2

Harvest: Main crop, Aug 5; second crop, Oct 22

Experimental Design: Split plot in a randomized complete block with four replications, N assigned to main plots and varieties to subplots

Comments: Emergence was quite rapid for all entries. MBLE was a week later in maturity than the other entries (Table 1). MBLE produced the highest grain yield. Rotten neck blast decreased yield in 1001. Second crop yield was also highest for MBLE (Table 2).

Table 1. Effect of N rate on agronomic performance of drill-seeded very early rice varieties and advanced experimental lines. Rice Research Station, Crowley, LA. 1991.

	N rate (lb/A)																		
	Days to 50% heading					Plant height					% Lodging/type*				Grain yield at 12% moisture				
Variety	60	90	120	150	Mean	60	90	120	150	Mean	60	90	120	150	60	90	120	150	Mean
								(cm)									(lb/A)		
Maybelle	74	74	75	76	75	76	79	82	83	80	0/0	0/0	0/0	0/0	4866	5623	6210	6500	5800
AS 3510	66	67	68	69	68	84	86	93	94	89	0/0	0/0	0/0	0/0	4950	5184	5670	6408	5553
1001	65	66	66	67	66	70	75	77	82	76	0/0	0/0	0/0	0/0	4872	5339	5369	5286	5217
N Mean	68	70	70	71		77	80	84	86						4896	5382	5750	6065	
C.V., %			1.23					3.16									10.31		
LSD (0.01):																			
Nitrogen			1					7									848		
Variety			1					3									563		
V within N			2					5									1126		
V across N			2					8									1248		

* Lodging rate in percent/lodging type on a scale of 1 to 5, where 1 = leaning and 5 = complete.

Table 2. Effect of N rate in main crop on grain yields of drill-seeded very early rice varieties and advanced experimental lines. Rice Research Station, Crowley, LA. 1991.

	Main crop grain yield at 12% moisture					Second crop grain yield at 12% moisture					Total grain yield at 12% moisture				
Variety	60	90	120	150	Mean	60	90	120	150	Mean	60	90	120	150	Mean
								(lb/A)							
Maybelle	4866	5623	6210	6500	5800	2349	2645	2634	2642	2567	7215	8268	8844	9142	8367
AS3510	4950	5184	5670	6408	5553	1380	1441	1653	1701	1544	6330	6625	7322	8109	7097
1001	4872	5339	5369	5286	5217	1010	1037	952	944	986	5883	6376	6321	6231	6202
N Mean	4896	5382	5750	6065		1580	1708	1746	1762		6476	7090	7496	7827	
C.V., %			10.31					6.67					7.90		
LSD (0.01):															
Nitrogen			848					ns					1004		
Variety			563					112					564		
V within N			1126					224					1129		
V across N			1248					304					1360		

Experiment: Very early variety x nitrogen trial

Location: Rice Research Station

Soil Type/Analysis: Crowley silt loam; pH: 6.1; O.M.: 1.02%; extractable nutrients (mg/kg): P-37, Na-71, K-86, Ca-1175, Mg-253, Zn-1.74, S-6.06, As-2.70, Fe-72.99

Variety/Seeding Rate: TBNT, MBLE, TXMT, ALAN, MILL, RSMT, JKSN, 2031, RT7015, 150 lb/A

Planting Method/Date: Water-seeded, Mar 28

Fertilization: 60 lb/A P_2O_5 and K_2O ppi; N source, ammonium sulfate; 0.54 lb zinc/A (foliar), Apr 23; second crop, 75 lb N/A

Plot Size: 7 x 25 ft (175 ft^2)

Emergence Date: ALAN, RT7015, Apr 2; MBLE, MILL, RSMT, TBNT, 2031, JKSN, Apr 3; TXMT, Apr 4

Water Management: Flooded, Mar 27; drained, Apr 1; reflooded, Apr 3; harvest drainage, July 5; second crop flooded, July 25; harvest drainage, Sep 27

Herbicides: 0.9 oz ai/A Londax (bensulfuron-methyl), Apr 23; 4.0 lb ai/A Bolero (thiobencarb), Apr 24; 0.9 oz ai/A Londax, May 7

Insecticides: 0.6 lb ai/A Furadan (carbofuran), May 4

Fungicides: 0.5 lb ai/A Benlate (benomyl), June 17

Harvest: Main crop, July 24; second crop, Oct 11

Experimental Design: Split plot in a randomized complete block with four replications, N assigned to main plots and varieties to subplots

Comments: All entries displayed very good to good seedling vigor. TBNT lodged significantly at high N rates with little influence on grain yield. Main crop yields overall were very good, with most entries requiring 120 lb N/A (Table 3). Second crop grain yields were excellent for all entries except TBNT (Table 4). Total yield of line 2031 was over 12,000 lb/A.

Table 3. Effect of N rate on agronomic performance of water-seeded very early rice varieties and advanced experimental lines.
Rice Research Station, Crowley, LA. 1991.

	N rate (lb/A)																		
	Days to 50% heading					Plant height					% Lodging/type*				Grain yield at 12% moisture				
Variety	60	90	120	150	Mean	60	90	120	150	Mean	60	90	120	150	60	90	120	150	Mean
						------------(cm)-----------									-------------(lb/A)-------------				
Tebonnet	77	80	81	82	80	112	119	120	120	118	0/0	38/3	65/4	83/5	7663	7888	7789	7745	7772
Maybelle	69	69	71	72	70	82	85	93	91	88	0/0	0/0	0/0	20/2	6116	6987	7509	7419	7008
Texmont	75	76	77	79	77	74	81	81	82	80	0/0	0/0	0/0	0/0	6078	6682	7598	7470	6957
Alan	79	80	81	82	81	87	94	97	100	95	0/0	0/0	5/1	30/3	7476	8405	8573	8315	8192
Millie	77	80	81	83	80	87	96	102	106	98	0/0	0/0	0/0	18/2	6058	7194	7701	7680	7158
Rosemont	76	77	80	79	78	73	78	83	86	80	0/0	0/0	0/0	0/0	7152	7747	7677	7821	7599
Jackson	77	80	80	82	80	86	94	96	101	94	0/0	0/0	0/0	18/2	7116	7691	8530	8585	7980
2031	75	79	80	82	79	77	86	89	92	86	0/0	0/0	0/0	0/0	7772	8148	8505	9092	8379
RT7015	77	79	80	81	79	75	83	84	89	83	0/0	0/0	0/0	0/0	6986	7384	8245	8684	7825
N																			
Mean	76	78	79	80		84	91	94	96						6935	7570	8014	8090	
C.V., %			0.98					3.08									5.21		
LSD (0.01):																			
Nitrogen			1					3									689		
Variety			1					3									370		
V within N			1					5									741		
V across N			1					6									975		

* Lodging rate in percent/lodging type on a scale of 1 to 5, where 1 = leaning and 5 = complete.

Table 4. Effect of N rate in main crop on grain yields of water-seeded very early rice varieties and advanced experimental lines. Rice Research Station, Crowley, LA. 1991.

	Main crop grain yield at 12% moisture					Second crop grain yield at 12% moisture					Total grain yield at 12% moisture				
Variety	60	90	120	150	Mean	60	90	120	150	Mean	60	90	120	150	Mean
	-----	-----	-----	-----	-----	-----	-----	(lb/A)	-----	-----	-----	-----	-----	-----	-----
Tebonnet	7663	7888	7789	7745	7772	2258	1743	1451	1323	1694	9921	9632	9240	9068	9465
Maybelle	6116	6987	7509	7419	7008	3088	3603	3580	3548	3455	9204	10590	11089	10967	10463
Texmont	6078	6682	7598	7470	6957	3009	3264	3323	3198	3199	9088	9947	10921	10668	10156
Alan	7476	8405	8573	8315	8192	3188	2844	2828	2505	2841	10664	11250	11401	10820	11034
Millie	6058	7194	7701	7680	7158	3387	3400	3697	3123	3402	9445	10594	11398	10803	10560
Rosemont	7152	7747	7677	7821	7599	2697	3055	2980	3214	2987	9849	10802	10657	11035	10586
Jackson	7116	7691	8530	8585	7980	3501	3176	3285	2892	3214	10617	10866	11815	11478	11194
2031	7772	8148	8505	9092	8379	3765	3615	3636	4019	3759	11537	11764	12141	13112	12138
RT7015	6986	7384	8245	8684	7825	3051	3094	3341	3338	3206	10037	10478	11587	12023	11031
N Mean	6935	7570	8014	8090		3105	3088	3125	3018		10040	10658	11139	11108	
C.V., %			5.21					9.24					5.05		
LSD (0.01):															
Nitrogen			689					ns					913		
Variety			370					265					503		
V within N			741					529					1007		
V across N			975					570					1310		

Experiment: Early variety x nitrogen trial

Location: Rice Research Station

Soil Type/Analysis: Crowley silt loam; pH: 6.5; O.M.: 0.93%; extractable nutrients (mg/kg): P-30, Na-66, K-78, Ca-1211, Mg-268, Zn-1.81, S-6.01, As-3.08, Fe-69.84

Variety/Seeding Rate: LMNT, KATY, MARS, RICO, LCSN, ORIN, CPRS, BNGL, 2146, 3072, 150 lb/A

Planting Method/Date: Water-seeded, Mar 28

Fertilization: 60 lb/A P_2O_5 and K_2O ppi; N source, ammonium sulfate; 0.54 lb/A zinc (foliar), Apr 23; second crop, 75 lb N/A

Plot Size: 7 x 25 ft (175 ft^2)

Emergence Date: MARS, CPRS, Apr 4; ORIN, KATY, BNGL, 2146, Apr 5; LCSN, RICO, Apr 7; LMNT, 3072, Apr 8

Water Management: Flooded, Mar 27; drained, Apr 2; reflooded, Apr 5; harvest drainage, July 15; second crop flooded, Aug 2; harvest drainage, Oct 10

Herbicides: 0.9 oz ai/A Londax (bensulfuron-methyl), Apr 23; 4.0 lb ai/A Bolero (thiobencarb), Apr 24; 0.9 oz ai/A Londax, May 7

Insecticides: 0.6 lb ai/A Furadan (carbofuran), May 4

Fungicides: 0.5 lb ai/A Benlate (benomyl), June 17

Harvest: Main crop, Aug 1; second crop, Nov 2

Experimental Design: Split plot in a randomized complete block with four replications, N assigned to main plots and varieties to subplots

Comments: KATY, MARS, CPRS, BNGL, ORIN, and 2146 displayed very good seedling vigor, while vigor of other entries was fair. Lodging was severe for MARS, RICO, KATY, and ORIN at high rates of N (Table 5). Yields in the main and second crops were good to excellent (Table 6).

Table 5. Effect of N rate on agronomic performance of water-seeded early rice varieties and advanced experimental lines. Rice Research Station, Crowley, LA. 1991.

	N rate (lb/A)																		
	Days to 50% heading					Plant height					% Lodging/type*				Grain yield at 12% moisture				
Variety	60	90	120	150	Mean	60	90	120	150	Mean	60	90	120	150	60	90	120	150	Mean
						(cm)									(lb/A)				
Lemont	85	86	87	89	87	79	84	84	87	83	0/0	0/0	0/0	0/0	7619	8235	8640	8263	8189
Katy	82	84	86	88	85	91	99	106	109	101	0/0	0/0	18/1	50/4	6587	7634	7583	6733	7134
Mars	85	86	87	88	86	97	108	109	109	106	0/0	40/4	73/4	88/5	7561	8330	8296	7335	7881
Rico 1	87	87	88	90	88	92	103	102	107	101	5/1	55/3	83/4	83/4	8863	9891	9453	8721	9234
Lacassine	82	83	84	85	84	78	83	86	90	85	0/0	0/0	0/0	0/0	7192	8110	8910	8910	8280
Orion	85	85	86	87	86	89	93	99	101	96	13/1	35/4	85/5	90/5	7953	8619	9013	7825	8352
Cypress	82	83	85	86	84	76	82	86	90	83	0/0	0/0	0/0	25/2	7326	8370	8612	8437	8186
Bengal	86	87	87	89	87	78	85	86	88	85	0/0	0/0	0/0	5/1	7675	8665	9218	9006	8641
2146	86	86	86	87	86	91	98	104	105	100	0/0	0/0	0/0	0/0	7800	8282	8793	8635	8377
3072	83	84	85	87	85	79	84	89	92	86	0/0	0/0	0/0	0/0	7642	8405	8730	8646	8356
N																			
Mean	84	85	86	88		85	92	95	98						7622	8454	8725	8251	
C.V., %			0.79					2.99									4.69		
LSD (0.01):																			
Nitrogen			1					3									416		
Variety			1					3									359		
V within N			1					5									720		
V across N			1					5									1067		

* Lodging rate in percent/lodging type on a scale of 1 to 5, where 1 = leaning and 5 = complete.

Table 6. Effect of N rate in main crop on grain yields of water-seeded early rice varieties and advanced experimental lines. Rice Research Station, Crowley, LA. 1991.

	Main crop grain yield at 12% moisture					Second crop grain yield at 12% moisture					Total grain yield at 12% moisture				
Variety	60	90	120	150	Mean	60	90	120	150	Mean	60	90	120	150	Mean
	(lb/A)														
Lemont	7619	8235	8640	8263	8189	2808	2724	3094	2884	2878	10427	10960	11734	11147	11067
Katy	6587	7634	7583	6733	7134	2602	2502	2267	2126	2374	9189	10136	9850	8860	9509
Mars	7561	8330	8296	7335	7881	2337	2276	1699	1626	1984	9898	10606	9995	8961	9865
Rico 1	8863	9891	9453	8721	9234	2088	1505	1207	1514	1578	10951	11396	10659	10235	10810
Lacassine	7192	8110	8910	8910	8280	2738	2651	2752	2809	2737	9929	10761	11661	11718	11017
Orion	7953	8619	9013	7825	8352	2168	2081	1522	1849	1905	10121	10700	10535	9674	10258
Cypress	7326	8370	8612	8437	8186	2805	2928	2681	2961	2844	10131	11298	11294	11398	11030
Bengal	7675	8665	9218	9006	8641	2340	2368	2387	2836	2483	10016	11033	11606	11842	11124
2146	7800	8282	8793	8635	8377	1902	1952	1979	1976	1952	9702	10233	10772	10611	10330
3072	7642	8405	8730	8646	8356	3447	3207	3337	3127	3280	11089	11612	12068	11774	11636
N															
Mean	7622	8454	8725	8251		2523	2419	2293	2371		10145	10874	11017	10622	
C.V., %			4.69					9.85					4.54		
LSD (0.01):															
Nitrogen			416					ns					570		
Variety			359					219					449		
V within N			720					439					900		
V across N			1067					525					1022		

Experiment: Aromatic variety x nitrogen trial

Location: Rice Research Station

Soil Type/Analysis: Crowley silt loam; pH: 6.3; O.M.: 1.13%; extractable nutrients (mg/kg): P-33, Na-69, K-74, Ca-1264, Mg-264, Zn-1.78, S-6.64, As-2.65, Fe-81.52

Variety/Seeding Rate: LMNT, JSMN, DLLA, DLMT, 2215, 3046, 150 lb/A

Planting Method/Date: Water-seeded, Mar 29

Fertilization: 60 lb/A P_2O_5 and K_2O ppi; N source, ammonium sulfate; 0.54 lb/A zinc (foliar), Apr 23; second crop, 75 lb N/A

Plot Size: 7 x 25 ft (175 ft^2)

Emergence Date: DLLA, DLMT, Apr 5; LMNT, JSMN, 2215, 3046, Apr 7

Water Management: Flooded, Mar 27; drained, Apr 2; reflooded, Apr 5; harvest drainage, July 15; second crop flooded, Aug 2; harvest drainage, Oct 10

Herbicides: 0.9 oz ai/A Londax (bensulfuron-methyl), Apr 23; 4.0 lb ai/A Bolero (thiobencarb), Apr 24; 0.9 oz ai/A Londax, May 7

Insecticides: 0.6 lb ai/A Furadan (carbofuran), May 4

Fungicides: 0.5 lb ai/A Benlate (benomyl), June 17

Harvest: Main crop, July 31; second crop, Nov 2

Experimental Design: Split plot in a randomized complete block with four replications, N assigned to main plots and varieties to subplots

Comments: Emergence was fair to good. Lodging was severe for DLLA and JSMN at high rates of N (Table 7). Yields in the main and second crops were good to excellent for all entries except DLLA (Table 8).

Table 7. Effect of N rate on agronomic performance of water-seeded aromatic rice varieties and advanced experimental lines. Rice Research Station, Crowley, LA. 1991.

	N rate (lb/A)																		
	Days to 50% heading					Plant height					% Lodging/type*				Grain yield at 12% moisture				
Variety	60	90	120	150	Mean	60	90	120	150	Mean	60	90	120	150	60	90	120	150	Mean
						(cm)									(lb/A)				
Lemont	85	86	87	88	87	76	81	84	86	82	0/0	0/0	0/0	0/0	8048	8354	8608	8734	8436
Jasmine 85	97	97	98	99	98	95	101	102	103	100	0/0	0/0	43/3	80/5	8028	7761	7116	6142	7262
Della	91	91	92	93	92	116	122	122	127	122	0/0	75/4	73/4	75/4	6553	6892	5961	5041	6112
Dellmont	84	86	87	88	86	75	81	81	88	81	0/0	0/0	0/0	0/0	7271	7871	8554	7680	7844
2215	81	82	83	84	83	78	82	87	87	84	0/0	0/0	0/0	10/1	6597	7734	7657	7554	7386
3046	83	83	84	86	84	80	85	88	90	86	0/0	0/0	0/0	0/0	7470	8080	8487	8318	8089
N																			
Mean	87	88	89	90		87	92	94	97						7328	7782	7731	7245	
C.V., %			0.83					2.29									7.42		
LSD (0.01):																			
Nitrogen			1					3									ns		
Variety			1					2									524		
V within N			3					4									1049		
V across N			2					5									1122		

* Lodging rate in percent/lodging type on a scale of 1 to 5, where 1 = leaning and 5 = complete.

Table 8. Effect of N rate in main crop on grain yields of water-seeded aromatic rice varieties and advanced experimental lines. Rice Research Station, Crowley, LA. 1991.

Variety	Main crop grain yield at 12% moisture					Second crop grain yield at 12% moisture					Total grain yield at 12% moisture				
	60	90	120	150	Mean	60	90	120	150	Mean	60	90	120	150	Mean
	(lb/A)														
Lemont	8048	8354	8608	8734	8436	2523	2573	2824	2753	2668	10571	10927	11432	11488	11104
Jasmine 85	8028	7761	7116	6142	7262	3678	3785	3720	2274	3364	11706	11546	10836	8416	10626
Della	6553	6892	5961	5041	6112	1873	831	944	945	1148	8426	7723	6905	5986	7260
Dellmont	7271	7871	8554	7680	7844	2817	2787	2796	3091	2873	10088	10658	11349	10771	10717
2215	6597	7734	7657	7554	7386	2912	2932	3002	3005	2963	9509	10666	10660	10559	10348
3046	7470	8080	8487	8318	8089	2725	2155	2773	2892	2636	10195	10235	11260	11210	10725
N Mean	7328	7782	7731	7245		2755	2510	2676	2493		10083	10293	10407	9738	
C.V., %			7.42					11.59					6.43		
LSD (0.01):															
Nitrogen			ns					298					641		
Variety			525					284					613		
V within N			1049					569					1225		
V across N			1122					597					1285		

Experiment: Very early variety x nitrogen trial

Location: East Carroll Parish, Buford Perry Farm

Soil Type/Analysis: Sharkey clay; pH: 6.7; O.M.: 2.88%; extractable nutrients (mg/kg): P-230, Na-65, K-516, Ca-6944, Mg-1443, Zn-3.33, S-5.30, As-7.25, Fe-104.5

Variety/Seeding Rate: TBNT, MBLE, TXMT, ALAN, MILL, RSMT, JKSN, 2031, RT7015, 100 lb/A

Planting Method/Date: Drill-seeded, May 24

Fertilization: N source, ammonium sulfate; 0.54 lb/A zinc (foliar), June 26

Plot Size: 7 x 25 ft (175 ft^2)

Emergence Date: ALAN, 2031, MILL, TBNT, June 2; MBLE, RSMT, JKSN, RT7015, TXMT, June 3

Water Management: Flushed, May 27, June 5, June 17; flooded, June 26; harvest drainage, Sep 10

Herbicides: 3.0 lb ai/A Stam (propanil) + 2.0 lb ai/A Bolero (thiobencarb), June 15; 4.0 lb ai/A Stam, June 22; 0.9 oz ai/A Londax (bensulfuron-methyl), July 23; 4.0 lb ai/A Ordram (molinate), July 8; 0.9 oz ai/A Londax, July 23

Insecticides: 0.6 lb ai/A Furadan (carbofuran), July 18; 0.25 lb ai/A methyl parathion, Aug 26

Fungicides: 0.75 lb ai/A Benlate (benomyl), Aug 7, Aug 26

Harvest: Sep 30

Experimental Design: Split plot in a randomized complete block with four replications, N assigned to main plots and varieties to subplots

Comments: All entries emerged within 10 days of planting. The highest rate of fertilizer N was required for optimum grain yields (Table 9). Significant lodging occurred in Tebonnet but had little influence on yield. Yields for all entries were good to excellent except for Maybelle.

Table 9. Effect of N rate on agronomic performance of drill-seeded very early rice varieties and advanced experimental lines. Buford Perry Farm, East Carroll Parish, LA. 1991.

	N rate (lb/A)																		
	Days to 50% heading					Plant height					% Lodging/type*				Grain yield at 12% moisture				
Variety	60	90	120	150	Mean	60	90	120	150	Mean	60	90	120	150	60	90	120	150	Mean
						------------(cm)-----------									-------------(lb/A)-------------				
Tebonnet	78	79	80	82	80	103	106	110	113	108	20/3	70/4	58/4	90/5	7493	7955	8116	8593	8039
Maybelle	72	72	73	74	73	72	76	79	81	77	0/0	0/0	0/0	0/0	5084	6210	5872	6696	5966
Texmont	76	77	78	79	78	67	68	70	74	70	0/0	0/0	0/0	0/0	6296	6823	7519	7590	7057
Alan	76	78	80	80	79	82	86	90	91	87	0/0	0/0	0/0	0/0	7470	8142	8427	8945	8246
Millie	77	79	80	82	80	86	92	93	97	92	0/0	0/0	0/0	0/0	6194	6932	7054	7787	6992
Rosemont	75	78	79	80	78	67	70	71	76	71	0/0	0/0	0/0	0/0	6942	7703	8407	8654	7927
Jackson	79	80	81	82	81	76	80	83	89	82	0/0	0/0	0/0	0/0	6252	7034	7185	8085	7139
2031	78	80	81	82	80	73	77	79	81	78	0/0	0/0	0/0	0/0	6851	7636	7981	8507	7744
RT7015	77	79	80	81	79	73	77	79	81	78	0/0	0/0	0/0	0/0	6057	6925	7094	7987	7016
N																			
Mean	77	78	79	80		78	81	84	87						6515	7262	7517	8094	
C.V., %			0.95					2.60									5.00		
LSD (0.01):																			
Nitrogen			1					2									399		
Variety			1					2									341		
V within N			1					4									683		
V across N			2					4									754		

* Lodging rate in percent/lodging type on a scale of 1 to 5, where 1 = leaning and 5 = complete.

Experiment: Early variety x nitrogen trial

Location: East Carroll Parish, Buford Perry Farm

Soil Type/Analysis: Sharkey clay; pH: 6.7; O.M.: 2.72%; extractable nutrients (mg/kg): P-212, Na-59, K-497, Ca-6698, Mg-1365, Zn-2.36, S-5.22, As-3.58, Fe-137.2

Variety/Seeding Rate: LMNT, KATY, MARS, RICO, LCSN, ORIN, CPRS, BNGL, 2146, 3072, 100 lb/A

Planting Method/Date: Drill-seeded, May 24

Fertilization: N source, ammonium sulfate; 0.54 lb/A zinc (foliar), June 26

Plot Size: 7 x 25 ft (175 ft^2)

Emergence Date: KATY, CPRS, ORIN, 2146, June 2; BNGL, LCSN, RICO, LMNT, 3072, MARS, June 3

Water Management: Flushed, May 27, June 5, June 17; flooded, June 26; harvest drainage, Sep 10

Herbicides: 3.0 lb ai/A Stam (propanil) + 2.0 lb ai/A Bolero (thiobencarb), June 15; 4.0 lb ai/A Stam, June 22; 0.9 oz ai/A Londax (bensulfuron-methyl), July 23; 4.0 lb ai/A Ordram (molinate), July 8; 0.9 oz ai/A Londax, July 23

Insecticides: 0.6 lb ai/A Furadan (carbofuran), July 18; 0.25 lb ai/A methyl parathion, Aug 26

Fungicides: 0.75 lb ai/A Benlate (benomyl), Aug 7, Aug 26

Harvest: Sep 30

Experimental Design: Split plot in a randomized complete block with four replications, N assigned to main plots and varieties to subplots

Comments: All entries emerged within 10 days of planting. The highest rate of fertilizer N was required for optimum yields of all entries (Table 10). Yields were good to excellent with RICO yielding over 10,000 lb/A.

Table 10. Effect of N rate on agronomic performance of drill-seeded early rice varieties and advanced experimental lines. Buford Perry Farm, East Carroll Parish, LA. 1991.

	N rate (lb/A)																			
	Days to 50% heading					Plant height					% Lodging/type*				Grain yield at 12% moisture				
Variety	60	90	120	150	Mean	60	90	120	150	Mean	60	90	120	150	60	90	120	150	Mean
						------------(cm)-----------									-------------(lb/A)-------------				
Lemont	87	90	90	91	90	76	78	85	89	82	0/0	0/0	0/0	0/0	7055	7269	7897	8173	7598
Katy	85	88	89	91	89	95	102	107	111	104	0/0	0/0	0/0	5/1	6542	7156	7693	7766	7289
Mars	80	81	81	84	81	97	100	109	112	105	0/0	0/0	5/1	8/1	8014	8598	9037	9408	8764
Rico 1	81	82	84	85	83	90	93	98	103	96	0/0	0/0	0/0	5/1	9591	9910	10681	10919	10275
Lacassine	85	87	89	90	88	76	81	89	86	83	0/0	0/0	0/0	0/0	7206	7718	8156	8335	7854
Orion	78	80	79	81	80	93	90	101	106	97	0/0	0/0	0/0	0/0	7546	7991	8311	8516	8091
Cypress	85	86	88	89	87	82	82	91	97	88	0/0	0/0	0/0	0/0	7447	7889	8061	8658	8014
Bengal	80	80	80	83	81	81	78	88	91	85	0/0	0/0	0/0	0/0	7785	8388	8974	9640	8697
2146	85	86	86	86	86	93	94	101	106	98	0/0	0/0	0/0	0/0	7858	8274	8681	8975	8447
3072	83	84	86	86	85	76	76	87	86	81	0/0	0/0	0/0	0/0	6765	7529	7909	8350	7638
N																			
Mean	83	84	85	87		86	87	96	99						7581	8072	8540	8874	
C.V., %			0.95					3.64									3.50		
LSD (0.01):																			
Nitrogen			1					5									305		
Variety			1					3									268		
V within N			1					6									537		
V across N			2					8									591		

* Lodging rate in percent/lodging type on a scale of 1 to 5, where 1 = leaning and 5 = complete.

Experiment: Very early variety x nitrogen trial

Location: Vermilion Parish, Errol Lounsberry Farm

Soil Type/Analysis: Crowley silt loam; pH: 5.0; O.M.: 1.47%; extractable nutrients (mg/kg): P-71, Na-35, K-118, Ca-763, Mg-126, Zn-1.41, S-10.47, As-3.55, Fe-171.1

Variety/Seeding Rate: TBNT, MBLE, TXMT, ALAN, MILL, RSMT, JKSN, 2031, RT7015, 150 lb/A

Planting Method/Date: Water-seeded, Mar 27

Fertilization: 60 lb/A P_2O_5 and K_2O ppi; N source, ammonium sulfate; second crop, 75 lb N/A; 0.54 lb/A zinc (foliar), May 3

Plot Size: 7 x 25 ft (175 ft^2)

Emergence Date: ALAN, Apr 1; 2031, Apr 2; MBLE, RT7015, Apr 3; MILL, RSMT, JKSN, Apr 4; TBNT, Apr 5; TXMT, Apr 6

Water Management: Flooded, Mar 26; drained, Mar 29; reflooded, Apr 1; harvest drainage, July 15; second crop flooded, Aug 3; harvest drainage, Oct 5

Herbicides: 3.5 lb ai/A Ordram (molinate), Apr 16; 1.2 oz ai/A Londax (bensulfuron-methyl), Apr 17; 0.6 oz ai/A Londax, May 3

Insecticides: 0.6 lb ai/A Furadan (carbofuran), May 3

Fungicides: 0.75 lb ai/A Benlate (benomyl), May 30, June 13

Harvest: Main crop, July 29; second crop, Oct 17

Experimental Design: Split plot in a randomized complete block with four replications, N assigned to main plots and varieties to subplots

Comments: All entries displayed very good to fair seedling vigor. Emergence of TBNT and TXMT was slow. All entries lodged significantly, especially at N rates above 60 lb/A (Table 11). Severe disease pressure and lodging significantly reduced yields of all entries. Second crop grain yields were good although main crop stubble was reduced due to disease (Table 12).

Table 11. Effect of N rate on agronomic performance of water-seeded very early rice varieties and advanced experimental lines.
Errol Lounsberry Farm, Vermilion Parish, LA. 1991.

	N rate (lb/A)																		
	Days to 50% heading					Plant height					% Lodging/type*				Grain yield at 12% moisture				
Variety	60	90	120	150	Mean	60	90	120	150	Mean	60	90	120	150	60	90	120	150	Mean
						------------(cm)-----------									-------------(lb/A)-------------				
Tebonnet	85	87	88	90	88	113	118	119	115	116	68/3	88/4	90/4	90/4	4936	4386	4218	3435	4244
Maybelle	73	75	76	77	75	85	86	91	88	88	83/3	90/5	90/5	90/5	5240	4902	4625	3163	4483
Texmont	80	81	81	82	81	79	82	82	80	81	25/2	38/2	48/2	50/3	5371	5496	4335	4247	4862
Alan	83	85	87	88	86	93	92	99	98	95	0/0	70/4	88/4	90/4	5437	4486	3967	3845	4434
Millie	85	87	88	88	87	95	96	100	100	98	48/2	83/3	88/4	83/5	5453	4548	4205	3882	4522
Rosemont	81	83	85	87	84	76	81	83	82	81	5/1	10/1	30/3	58/3	5803	5572	4912	4448	5184
Jackson	85	85	87	89	87	90	95	95	98	95	35/3	65/3	90/4	90/5	5157	5164	4341	4006	4667
2031	81	83	86	87	84	82	85	87	86	85	5/1	40/3	50/3	58/3	5905	5167	4843	4441	5089
RT7015	84	86	86	89	86	85	85	87	86	86	0/0	8/1	8/1	25/2	5773	5468	5287	4467	5249
N																			
Mean	82	84	85	86		89	91	94	93						5453	5021	4526	3993	
C.V., %			1.08					3.20									8.63		
LSD (0.01):																			
Nitrogen			1					5									657		
Variety			1					3									381		
V within N			2					5									762		
V across N			2					7									968		

* Lodging rate in percent/lodging type on a scale of 1 to 5, where 1 = leaning and 5 = complete.

Table 12. Effect of N rate in main crop on grain yields of water-seeded very early rice varieties and advanced experimental lines. Errol Lounsberry Farm, Vermilion Parish, LA. 1991.

	Main crop grain yield at 12% moisture					Second crop grain yield at 12% moisture					Total grain yield at 12% moisture				
Variety	60	90	120	150	Mean	60	90	120	150	Mean	60	90	120	150	Mean
	(lb/A)														
Tebonnet	4936	4386	4218	3435	4244	2029	2304	2293	2141	2192	6965	6690	6510	5576	6436
Maybelle	5240	4902	4625	3163	4483	2139	2317	2335	2178	2242	7379	7219	6960	5341	6725
Texmont	5371	5496	4335	4247	4862	2508	2377	1668	2201	2189	7879	7873	6003	6448	7051
Alan	5437	4486	3967	3845	4434	2427	1962	2676	2327	2348	7864	6447	6644	6172	6782
Millie	5453	4548	4205	3882	4522	2555	2231	2165	3046	2499	8008	6779	6370	6928	7021
Rosemont	5803	5572	4912	4448	5184	2285	1828	2079	2288	2120	8088	7401	6991	6736	7304
Jackson	5157	5164	4341	4006	4667	2178	2646	1947	2425	2299	7335	7810	6289	6431	6966
2031	5905	5167	4843	4441	5089	2086	2512	2559	2154	2328	7991	7679	7402	6595	7417
RT7015	5773	5468	5287	4467	5249	2463	2207	2381	2338	2347	8236	7675	7667	6804	7596
N Mean	5453	5021	4526	3993		2297	2265	2234	2344		7750	7286	6760	6337	
C.V., %			8.63					21.11					8.66		
LSD (0.01):															
Nitrogen			657					ns					804		
Variety			381					ns					566		
V within N			762					896					1132		
V across N			968					907					1330		

Experiment: Early variety x nitrogen trial

Location: Vermilion Parish, Errol Lounsberry Farm

Soil Type/Analysis: Crowley silt loam; pH: 4.9; O.M.: 1.27%; extractable nutrients (mg/kg): P-90, Na-28, K-99, Ca-665, Mg-100, Zn-1.46, S-9.07, As-7.11, Fe-197.6

Variety/Seeding Rate: LMNT, KATY, MARS, RICO, LCSN, ORIN, CPRS, BNGL, 2146, 3072, 150 lb/A

Planting Method/Date: Water-seeded, Mar 27

Fertilization: 60 lb/A P_2O_5 and K_2O ppi; N source, ammonium sulfate; second crop, 75 lb N/A; 0.54 lb/A zinc (foliar), May 3

Plot Size: 7 x 25 ft (175 ft^2)

Emergence Date: MARS, ORIN, Apr 1; CPRS, Apr 2; KATY, BNGL, 2146, Apr 3; LMNT, LCSN, RICO, Apr 4; 3072, Apr 5

Water Management: Flooded, Mar 26; drained, Mar 29; reflooded, Apr 1; harvest drainage, July 15; second crop flooded, Aug 3; harvest drainage, Oct 5

Herbicides: 3.5 lb ai/A Ordram (molinate), Apr 16; 1.2 oz ai/A Londax (bensulfuron-methyl), Apr 17; 0.6 oz ai/A Londax, May 3

Insecticides: 0.6 lb ai/A Furadan (carbofuran), May 3

Fungicides: 0.75 lb ai/A Benlate (benomyl), May 30, June 13

Harvest: Main crop, July 30; second crop, Oct 18

Experimental Design: Split plot in a randomized complete block with four replications, N assigned to main plots and varieties to subplots

Comments: Emergence was fair to good with KATY, ORIN, CPRS, BNGL, and 2146 displaying the most vigor. Severe sheath blight and blast incidence resulted in significant lodging and reduced yields (Table 13). Yields of all entries decreased as rate of fertilizer N increased. Second crop yields were fair to good and there were no differences among entries (Table 14).

Table 13. Effect of N rate on agronomic performance of water-seeded early rice varieties and advanced experimental lines. Errol Lounsberry Farm, Vermilion Parish, LA. 1991.

	N rate (lb/A)																		
	Days to 50% heading					Plant height					% Lodging/type*				Grain yield at 12% moisture				
Variety	60	90	120	150	Mean	60	90	120	150	Mean	60	90	120	150	60	90	120	150	Mean
						------------(cm)-----------									-------------(lb/A)-------------				
Lemont	91	93	94	94	93	82	82	84	84	83	0/0	5/1	5/1	0/0	5727	5144	4974	4604	5112
Katy	86	89	92	94	90	97	101	103	99	100	65/3	85/4	90/4	90/5	4988	4341	3819	3100	4062
Mars	89	91	92	94	92	96	103	104	104	102	70/3	83/4	85/4	90/4	5218	4602	4473	4122	4604
Rico 1	90	91	93	94	92	92	96	96	96	95	85/4	85/4	85/4	90/4	6238	5841	5075	4501	5414
Lacassine	88	88	91	92	90	84	86	85	88	86	13/2	25/3	55/3	43/3	5950	5717	4940	4409	5254
Orion	87	88	90	92	90	90	91	93	98	93	80/3	88/5	88/4	90/5	5266	4486	4543	4029	4581
Cypress	85	87	88	90	87	78	82	85	84	82	0/0	15/1	28/3	33/3	5780	4920	4785	4102	4897
Bengal	90	92	94	94	93	84	86	88	87	86	20/2	18/2	5/1	22/2	5676	5814	5391	5312	5548
2146	88	88	91	92	90	99	102	100	102	101	5/1	33/3	38/3	70/3	4788	4607	4209	3713	4329
3072	88	89	90	92	90	83	84	86	85	85	23/3	45/2	42/3	60/3	5750	5673	4899	4560	5221
N Mean	88	90	92	93		89	91	92	93						5538	5115	4711	4245	
C.V., %			1.06					3.00									9.50		
LSD (0.01):																			
Nitrogen			1					2									773		
Variety			1					2									432		
V within N			2					5									865		
V across N			2					5									1121		

* Lodging rate in percent/lodging type on a scale of 1 to 5, where 1 = leaning and 5 = complete.

Table 14. Effect of N rate in main crop on grain yields of water-seeded early rice varieties and advanced experimental lines. Errol Lounsberry Farm, Vermilion Parish, LA. 1991.

	Main crop grain yield at 12% moisture					Second crop grain yield at 12% moisture					Total grain yield at 12% moisture				
Variety	60	90	120	150	Mean	60	90	120	150	Mean	60	90	120	150	Mean
	(lb/A)														
Lemont	5727	5144	4974	4604	5112	1476	1588	1717	1803	1646	7203	6732	6690	6407	6758
Katy	4988	4341	3819	3100	4062	1710	1233	1224	1953	1530	6698	5574	5043	5053	5592
Mars	5218	4602	4473	4122	4604	1841	1783	1745	1340	1677	7060	6385	6218	5463	6282
Rico 1	6238	5841	5075	4501	5414	1442	1890	1285	1674	1573	7679	7731	6361	6175	6986
Lacassine	5950	5717	4940	4409	5254	1274	1615	1773	1716	1595	7225	7332	6714	6125	6849
Orion	5266	4486	4543	4029	4581	1485	2168	1093	1654	1600	6751	6654	5635	5682	6181
Cypress	5780	4920	4785	4102	4897	1511	1810	1323	1817	1615	7291	6730	6109	5919	6512
Bengal	5676	5814	5391	5312	5548	1402	1786	1576	1698	1615	7078	7600	6967	7009	7163
2146	4788	4607	4209	3713	4329	1339	1489	1538	1080	1362	6127	6096	5747	4794	5691
3072	5750	5673	4899	4560	5221	1690	1597	1513	1294	1524	7441	7270	6412	5855	6744
N															
Mean	5538	5115	4711	4245		1517	1696	1479	1603		7055	6810	6190	5848	
C.V., %			9.50					29.46					9.43		
LSD (0.01):															
Nitrogen			773					ns					691		
Variety			432					ns					566		
V within N			865					861					1134		
V across N			1121					865					1273		

Experiment: Early variety x nitrogen trial

Location: Rapides Parish, Will Bollich Farm

Soil Type/Analysis: Moreland clay; pH: 6.8; O.M.: 2.73%; extractable nutrients (mg/kg): P-212, Na-33, K-283, Ca-3519, Mg-885, Zn-5.86, S-10.53, As-5.98, Fe-287.4

Variety/Seeding Rate: LMNT, KATY, MARS, RICO, LCSN, ORIN, CPRS, BNGL, 2146, 3072, 100 lb/A

Planting Method/Date: Drill-seeded, Apr 10

Fertilization: N source, urea; 0.54 lb/A zinc (foliar), May 26

Plot Size: 7 x 25 ft (175 ft^2)

Emergence Date: KATY, CPRS, 2146, Apr 21; ORIN, MARS, Apr 22; BNGL, LCSN, RICO, LMNT, 3072, Apr 23

Water Management: Flooded, May 15; harvest drainage, Aug 1

Herbicides: 3.0 lb ai/A Stam (propanil) + 3.0 lb ai/A Bolero (thiobencarb), May 13; 0.9 oz ai/A Londax (bensulfuron-methyl), June 4; 3.0 lb ai/A Ordram (molinate), June 4

Insecticides: 0.6 lb ai/A Furadan (carbofuran), June 8

Fungicides: 0.75 lb ai/A Benlate (benomyl), July 13

Harvest: Aug 20

Experimental Design: Split plot in a randomized complete block with four replications, N assigned to main plots and varieties to subplots

Comments: Entries emerged within 10 to 14 days of planting. Time to reach 50% heading for all entries was longer than normal. Reduced plant height of all entries indicated inefficient utilization of fertilizer N. Grain yields were generally lower at this location and the highest rate of N was required for optimum yields of all entries (Table 15). Yields of the medium-grain entries were higher than those of the long grains.

Table 15. Effect of N rate on agronomic performance of drill-seeded early rice varieties and advanced experimental lines. Will Bollich Farm, Rapides Parish, LA. 1991.

	N rate (lb/A)																		
	Days to 50% heading					Plant height					% Lodging/type*				Grain yield at 12% moisture				
Variety	60	90	120	150	Mean	60	90	120	150	Mean	60	90	120	150	60	90	120	150	Mean
						(cm)									(lb/A)				
Lemont	98	98	99	99	99	68	75	76	79	74	0/0	0/0	0/0	0/0	3684	4942	5284	5739	4912
Katy	97	96	97	96	97	77	88	93	95	88	0/0	0/0	0/0	0/0	3329	4170	4717	5771	4497
Mars	94	94	94	93	94	84	88	90	90	88	0/0	0/0	0/0	0/0	4727	5277	5196	6588	5447
Rico 1	97	96	97	96	97	72	80	83	84	80	0/0	0/0	0/0	0/0	4572	5866	6561	6916	5979
Lacassine	97	97	97	97	97	69	76	77	72	74	0/0	0/0	0/0	0/0	3937	4710	5265	5433	4836
Orion	94	93	93	92	93	76	82	84	83	81	0/0	0/0	0/0	0/0	4287	5766	5508	6400	5490
Cypress	95	96	96	96	96	74	79	82	79	79	0/0	0/0	0/0	0/0	4333	4750	5258	5973	5078
Bengal	96	95	95	95	95	71	74	76	76	74	0/0	0/0	0/0	0/0	3990	5177	5950	7240	5589
2146	96	95	97	94	96	79	87	88	92	86	0/0	0/0	0/0	0/0	3790	4295	5520	5979	4896
3072	96	96	96	97	96	68	75	77	76	74	0/0	0/0	0/0	0/0	4200	4729	5412	6111	5113
N Mean	96	96	96	96		74	80	83	83						4085	4968	5467	6215	
C.V., %			1.30					3.11									12.52		
LSD (0.01):																			
Nitrogen			ns					7									774		
Variety			1					2									602		
V within N			2					5									1205		
V across N			4					8									1375		

* Lodging rate in percent/lodging type on a scale of 1 to 5, where 1 = leaning and 5 = complete.

Experiment: Early variety x nitrogen trial

Location: Morehouse Parish, Zaunbrecher Farm

Soil Type/Analysis: Hebert silty clay; pH: 5.8; O.M.: 2.07%; extractable nutrients (mg/kg): P-133, Na-120, K-307, Ca-2905, Mg-846, Zn-4.19, S-8.57, As-0.00, Fe-203.2

Variety/Seeding Rate: LMNT, KATY, MARS, RICO, LCSN, ORIN, CPRS, BNGL, 2146, 3072, 150 lb/A

Planting Method/Date: Water-seeded, June 6

Fertilization: N source, ammonium sulfate; 0.54 lb/A zinc (foliar), June 26

Plot Size: 7 x 25 ft (175 ft^2)

Emergence Date: KATY, CPRS, June 11; ORIN, MARS, BNGL, LCSN, LMNT, 3072, 2146, June 12; RICO, June 13

Water Management: Flooded, June 6; drained, June 7; flooded, June 13; drained, June 18; flooded, June 22; harvest drainage, Sep 16

Herbicides: 4.0 lb ai/A Stam (propanil) June 21; 0.9 oz ai/A Londax (bensulfuron-methyl), June 24; 3.0 lb ai/A Ordram (thiobencarb), July 5; 0.9 oz ai/A Londax, July 20

Insecticides: 0.6 lb ai/A Furadan (carbofuran), July 5; 0.25 lb ai/A methyl parathion, Aug 24

Fungicides: 0.75 lb ai/A Benlate (benomyl), Aug 6, Aug 26

Harvest: Oct 2

Experimental Design: Split plot in a randomized complete block with four replications, N assigned to main plots and varieties to subplots

Comments: Entries emerged within 7 days of planting. Severe lodging at high rates of N reduced yields of some entries (Table 16). Excellent grain yields were produced by all entries at optimum N fertilization.

Table 16. Effect of N rate on agronomic performance of water-seeded early rice varieties and advanced experimental lines.
Zaunbrecher Farm, Morehouse Parish, LA. 1991.

	N rate (lb/A)																		
	Days to 50% heading					Plant height					% Lodging/type*				Grain yield at 12% moisture				
Variety	60	90	120	150	Mean	60	90	120	150	Mean	60	90	120	150	60	90	120	150	Mean
						------------(cm)-----------									-------------(lb/A)-------------				
Lemont	78	81	82	84	81	69	76	80	85	78	0/0	0/0	0/0	0/0	7852	8460	8086	8139	8134
Katy	74	76	77	79	77	85	95	97	104	95	13/1	60/3	83/5	88/5	7065	7908	8190	7885	7762
Mars	74	75	76	76	75	90	96	101	101	97	55/2	85/4	83/5	85/5	8117	8623	8227	7902	8217
Rico 1	77	77	79	80	78	88	95	98	101	95	38/2	68/4	78/4	85/4	9342	9791	10102	9166	9600
Lacassine	77	79	80	81	79	69	76	83	86	78	0/0	0/0	0/0	23/1	7695	8722	8945	8739	8526
Orion	73	74	74	75	74	81	85	90	93	87	78/3	83/4	88/5	65/4	7799	8822	8462	8291	8344
Cypress	76	79	79	80	79	70	80	86	88	81	0/0	0/0	0/0	25/3	7246	7866	8201	8270	7896
Bengal	74	75	76	78	76	72	78	83	87	80	40/1	65/3	48/3	75/4	8212	9059	8903	9169	8836
2146	76	76	78	78	77	86	88	95	98	92	0/0	0/0	0/0	23/1	7965	8715	8838	8757	8569
3072	74	76	78	78	77	63	73	76	82	74	0/0	0/0	0/0	0/0	7926	8543	8720	8774	8491
N																			
Mean	75	77	78	79		77	84	89	92						7922	8651	8667	8509	
C.V., %			1.03					3.54									5.55		
LSD (0.01):																			
Nitrogen			1					8									580		
Variety			1					3									434		
V within N			1					2									869		
V across N			1					9									1003		

* Lodging rate in percent/lodging type on a scale of 1 to 5, where 1 = leaning and 5 = complete.

Table 17. Growth stage information for the DD-50 Rice Management Program. Water-seeded rice varieties and advanced experimental lines. Rice Research Station, Crowley, LA. 1991.

Variety	Emergence date	First tiller	Green ring	Panicle 2 mm	Date of 50% heading
<u>Very Early</u>					
Tebonnet	4-03	4-21	5-15	5-22	6-16
Maybelle	4-03	4-23	5-11	5-19	6-06
Texmont	4-04	4-24	5-14	5-25	6-13
Alan	4-02	4-24	5-13	5-23	6-17
Millie	4-03	4-22	5-13	5-23	6-16
Rosemont	4-03	4-22	5-16	5-22	6-14
Jackson	4-03	4-22	5-16	5-22	6-16
2031	4-03	4-24	5-16	5-22	6-15
RT7015	4-02	4-22	5-18	5-27	6-15
<u>Early</u>					
Lemont	4-08	4-25	5-20	6-01	6-24
Katy	4-05	4-29	5-20	5-31	6-22
Mars	4-04	4-24	5-20	6-03	6-23
Rico 1	4-07	4-23	5-26	6-03	6-25
Lacassine	4-07	4-28	5-20	6-01	6-21
Orion	4-05	4-25	5-25	6-01	6-23
2207	4-04	4-22	5-20	5-31	6-21
2214	4-05	4-24	5-24	6-03	6-24
2146	4-05	4-24	5-20	6-04	6-23
3072	4-08	4-24	5-20	5-31	6-22
<u>Aromatic</u>					
Lemont	4-07	4-23	5-22	6-03	6-24
Jasmine	4-07	4-21	5-28	6-07	7-05
Della	4-05	4-24	5-27	6-07	6-29
Dellmont	4-05	4-24	5-22	5-31	6-23
2215	4-07	4-27	5-22	5-30	6-20
3046	4-07	4-24	5-24	6-02	6-21

Table 18. Growth stage information for the DD-50 Rice Management Program. Drill-seeded rice varieties and advanced experimental lines. Buford Perry Farm, East Carroll Parish, LA. 1991.

Variety	Emergence date	First tiller	Green ring	Panicle 2 mm	Date of 50% heading
Very Early					
Tebonnet	6-02	6-18	7-19	7-28	8-15
Maybelle	6-03	6-17	7-13	7-21	8-08
Texmont	6-03	6-17	7-16	7-24	8-13
Alan	6-02	6-16	7-17	7-25	8-14
Millie	6-02	6-17	7-16	7-25	8-15
Rosemont	6-03	6-17	7-19	7-27	8-13
Jackson	6-03	6-18	7-19	7-27	8-16
2031	6-02	6-17	7-17	7-25	8-15
RT7015	6-03	6-17	7-14	7-24	8-14
Early					
Lemont	6-03	6-18	7-23	7-31	8-25
Katy	6-02	6-17	7-26	8-05	8-24
Mars	6-03	6-17	7-20	7-29	8-16
Rico 1	6-03	6-17	7-22	7-30	8-18
Lacassine	6-03	6-17	7-23	8-01	8-23
Orion	6-02	6-17	7-19	7-27	8-15
2207	6-02	6-15	7-19	7-29	8-23
2214	6-03	6-16	7-20	7-29	8-16
2146	6-02	6-18	7-25	8-01	8-21
3072	6-03	6-17	7-22	7-31	8-20

Table 19. Growth stage information for the DD-50 Rice Management Program. Water-seeded rice varieties and advanced experimental lines. Errol Lounsberry Farm, Vermilion Parish, LA. 1991.

Variety	Emergence date	First tiller	Green ring	Panicle 2 mm	Date of 50% heading
Very Early					
Tebonnet	4-05	--*	5-17	5-29	6-23
Maybelle	4-03	--	5-11	5-19	6-10
Texmont	4-06	--	5-14	5-22	6-16
Alan	4-01	--	5-16	5-26	6-21
Millie	4-04	--	5-19	5-23	6-22
Rosemont	4-04	--	5-16	5-25	6-19
Jackson	4-04	--	5-22	5-29	6-22
2031	4-02	--	5-17	5-28	6-19
RT7015	4-03	--	5-21	5-31	6-21
Early					
Lemont	4-04	--	5-22	5-31	6-28
Katy	4-03	--	5-22	5-31	6-25
Mars	4-01	--	5-26	6-05	6-27
Rico 1	4-04	--	5-26	6-03	6-27
Lacassine	4-04	--	5-20	5-31	6-25
Orion	4-01	--	5-24	6-02	6-25
2207	4-02	--	5-17	5-29	6-22
2214	4-03	--	5-26	6-02	6-28
2146	4-03	--	5-25	6-02	6-25
3072	4-05	--	5-17	5-31	6-25

* Data not taken.

Table 20. Growth stage information for the DD-50 Rice Management Program. Drill-seeded rice varieties and advanced experimental lines. Will Bollich Farm, Rapides Parish, LA. 1991.

Variety	Emergence date	First tiller	Green ring	Panicle 2 mm	Date of 50% heading
<u>Early</u>					
Lemont	4-23	--*	6-13	6-22	7-18
Katy	4-21	--	6-13	6-23	7-16
Mars	4-22	--	6-10	6-19	7-13
Rico 1	4-23	--	6-17	6-25	7-16
Lacassine	4-23	--	6-13	6-23	7-16
Orion	4-22	--	6-13	6-22	7-12
2207	4-21	--	6-09	6-19	7-15
2214	4-23	--	6-12	6-20	7-14
2146	4-21	--	6-12	6-20	7-15
3072	4-23	--	6-09	6-19	7-15

* Data not taken.

Table 21. Growth stage information for the DD-50 Rice Management Program. Water-seeded rice varieties and advanced experimental lines. Zaunbrecher Farm, Morehouse Parish, LA. 1991.

Variety	Emergence date	First tiller	Green ring	Panicle 2 mm	Date of 50% heading
Early					
Lemont	6-12	6-25	7-18	8-03	8-26
Katy	6-11	6-23	7-18	7-28	8-22
Mars	6-12	6-25	7-19	8-01	8-20
Rico 1	6-13	6-25	7-24	8-03	8-23
Lacassine	6-12	6-26	7-16	8-02	8-24
Orion	6-12	6-23	7-19	7-30	8-19
2207	6-11	6-24	7-15	8-01	8-24
2214	6-12	6-25	7-19	8-01	8-21
2146	6-12	6-25	7-18	7-31	8-22
3072	6-12	6-25	7-18	7-31	8-22

EVALUATION OF COMMERCIAL VARIETIES, HYBRIDS, AND ADVANCED EXPERIMENTAL LINES FOR STRAIGHTHEAD

P.K. Bollich, W.J. Leonards, Jr., G.R. Romero, and D.M. Walker

INTRODUCTION

A straighthead evaluation nursery was established at the Rice Research Station, Crowley, LA, in 1988. Sixty-three entries were screened in 1991 for reaction to arsenic (As)-induced straighthead. Included in the nursery were 35 commercial varieties, both public and private, and 21, 3, and 1 advanced experimental lines from the rice varietal development programs of Louisiana, Texas, and Arkansas, respectively.

MATERIALS AND METHODS

The nursery was established on a Crowley silt loam soil. Approximately 120 lb N/A and 60 lb/A P_2O_5 and K_2O were banded 2 inches deep prior to planting. Arsenic as MSMA (monosodium salt of methylarsonic acid) was surface applied at the rate of 2 lb As/A, and the test area was flooded. Presoaked seed of each entry was seeded at the rate of 150 lb/A. The test area was drained for 4 days to encourage seedling anchorage. A shallow, permanent flood was then established. Pest control (weeds, insects, disease) was practiced as necessary. Evaluations for straighthead reaction were made at maturity, with each entry being rated on a scale of 0 to 9, based on the estimated percentage of normal grain yield. A rating of 0 indicated that there was no damage or apparent symptoms present and was considered to be highly resistant. A rating of 9 indicated that no grain was produced due to severe damage and was considered to be highly susceptible. Results of the evaluation are shown in Table 1.

Experiment: Straighthead evaluation

Location: Rice Research Station

Soil Type/Analysis: Crowley silt loam; pH: 6.6; O.M.: 1.30%; extractable nutrients (mg/kg): P-28, Na-92, K-123, Ca-1564, Mg-344, Zn-1.56, S-6.10, As-2.38, Fe-68.20

Variety/Seeding Rate: 60 entries, 150 lb/A

Planting Method/Date: Water-seeded, Apr 8

Fertilization: 60 lb/A P_2O_5 and K_2O + 120 lb N/A ppi; 0.54 lb ai/A zinc (foliar), Apr 23

Plot Size: 4 x 6 ft (24 ft^2)

Emergence Date: Data not taken

Water Management: Flooded, Apr 5; drained, Apr 10; reflooded, Apr 12; drained, Apr 22; reflooded, Apr 26; drained, May 6; reflooded, May 8

Herbicides: Arrosolo (3.0 lb ai/A propanil + 3.0 lb ai/A molinate), May 7; 0.9 oz ai/A Londax (bensulfuron-methyl), May 22

Insecticides: 0.6 lb ai/A Furadan (carbofuran), May 16

Fungicides: 0.5 lb ai/A Benlate (benomyl), July 2

Harvest: Straighthead evaluation, Aug 14

Experimental Design: Randomized complete block with 60 entries and 3 replications

Comments: Straighthead reaction overall was much less severe than in previous years.

Table 1. Straighthead evaluation for commercial rice varieties and advanced experimental lines. Rice Research Station, Crowley, LA. 1991.

Entry	Grain type*	Rating**
A301	L	5.0
9102146	L	5.0
Toro 2	L	4.3
V4716	M	4.0
8902031	L	3.7
9002106	L	3.3
L203	L	3.3
9102094	L	3.3
V7817	L	3.0
9102171	M	3.0
RT7015	L	3.0
Alan	L	3.0
L202	L	2.7
8803072	L	2.7
Texmont	L	2.7
8802097	L	2.7
8902192	M	2.7
9002134	L	2.7
Millie	L	2.3
Dellmont	L	2.3
9002115	L	2.3
8902195	L	2.3
Rosemont	L	2.3
Katy	L	2.3
Jasmine 85	L	2.0
Cypress	L	2.0
9002022	M	2.0
Maybelle	L	2.0
AS 3058	M	2.0
Bengal	M	2.0
Lemont	L	2.0
Mars	M	2.0
9102062	M	1.7
8902146	L	1.7
Jackson	L	1.7
Skybonnet	L	1.7
9102005	L	1.7
Taiquing	L	1.7
9002143	M	1.7
8903046	L	1.7
9102085	L	1.7
Lacassine	L	1.3
Saturn	M	1.3
Orion	M	1.3
Newbonnet	L	1.3

Continued.

Table 1. Continued.

Entry	Grain type*	Rating**
9102183	M	1.3
LA110	M	1.0
Tebonnet	L	1.0
9102008	M	1.0
Guichow	L	1.0
8902152	L	1.0
Mercury	M	1.0
Labelle	L	1.0
Rico 1	M	1.0
9101001	L	1.0
Gulfmont	L	1.0
9102168	M	0.7
9103069	M	0.7
8802168	L	0.3
AS 3510	L	0.3

* L = long grain, M = medium grain, S = short grain.
** Rating based on a scale from 0 to 9, where 0 = resistant and 9 = highly susceptible.

INFLUENCE OF POSTHEADING NITROGEN FERTILIZATION ON PERFORMANCE AND RATOON CROP GRAIN YIELDS OF TEBONNET, MAYBELLE, AND TEXMONT RICE

P.K. Bollich, W.J. Leonards, Jr., G.R. Romero, and D.M. Walker

INTRODUCTION

Rice farmers in southwest Louisiana have the opportunity to produce a second crop for many of the rice varieties currently being grown. Previous research has shown that second crop grain yields can be increased if additional fertilizer nitrogen (N) is applied to the second crop upon completion of main crop harvest. Preliminary studies have also indicated that N applied in the main crop after the advanced stages of heading may have a positive influence on regrowth of the ratoon crop and resultant grain yield.

This study was initiated to determine the response of second crop grain yields of three very early rice varieties to variable rates and timings of N applied to the main crop.

MATERIALS AND METHODS

A N rate of 120 lb/A as ammonium sulfate was banded approximately 2 inches deep with 60 lb/A P_2O_5 and K_2O 1 day prior to flooding the water-seeded experiment. Presoaked seed of each variety was seeded at the rate of 150 lb/A into a shallow flood. The rice was grown in a pinpoint flood culture. Approximately 60 lb N/A was applied at either 8 or 4 days prior to draining of the main crop and 4 or 8 days after draining. A similar set of treatments received an additional 60 lb N/A after harvest of the main crop and prior to permanently flooding the second crop. Either 60 or 120 lb N/A were also applied in the second crop in treatments where no N was applied at late heading in the main crop. The main crop was harvested, and grain yields were estimated for each variety. After completion of harvest, fertilizer N in the second crop treatments was surface-broadcast and a shallow flood was immediately established. The number of ratoon tillers was determined about 4 weeks after flooding.

Pest control (weeds, insects, disease) was practiced when necessary. Plant height, days to 50% heading, grain yield, and milling yield were estimated for each variety in the main crop. Individual whole plots were combine-harvested at field maturity, and grain moisture and grain yield were measured.

Experiment: Second crop variety x nitrogen study

Location: Rice Research Station

Soil Type/Analysis: Crowley silt loam; pH: 6.0; O.M.: 1.04%; extractable nutrients (mg/kg): P-32, Na-69, K-79, Ca-1071, Mg-230, Zn-0.77, S-7.39, As-3.08, Fe-55.15

Variety/Seeding Rate: TBNT, MBLE, TXMT, 150 lb/A

Planting Method/Date: Water-seeded, Mar 28

Fertilization: First crop, 60 lb/A P_2O_5 and K_2O + 120 lb N/A (ammonium sulfate) ppi; 0.54 lb zinc/A (foliar), Apr 23; second crop, variable rates (ammonium sulfate) and application timings

Plot Size: 7 x 25 ft (175 ft^2)

Emergence Date: MBLE, TBNT, Apr 3; TXMT, Apr 4

Water Management: Flooded, Mar 27; drained, Apr 1; reflooded, Apr 3; harvest drainage, July 5; second crop flooded, July 25; drained, Sep 27

Herbicides: 0.9 oz ai/A Londax (bensulfuron-methyl), Apr 23; 4.0 lb ai/A Bolero (thiobencarb), Apr 24; 0.9 oz ai/A Londax, May 16

Insecticides: 0.6 lb ai/A Furadan (carbofuran), May 4

Fungicides: 0.5 lb ai/A Benlate (benomyl), June 17

Harvest: Main crop, July 23; second crop, Oct 11

Experimental Design: Split plot in a randomized complete block with four replications, varieties assigned to main plots and nitrogen to subplots.

Comments: Emergence and stand establishment of all entries were good to fair. Main crop grain yield of TBNT was significantly higher than MBLE or TXMT (Table 1). Milling appeared to be affected by N treatment. Overall milling was poor, however, it is questionable whether the differences observed in % head rice were actually due to N application in the main crop. In the previous year of this study, milling yields were unaffected. Some of the N treatments appeared to influence main crop grain yields, especially with TBNT when N was applied 4 days postdrain. Lodging was severe but erratic in this treatment and did not appear to be the result of the N application. Visual differences in regrowth in the second crop due to heading applications of N were quite obvious. Number of tillers tended to increase as rate of N increased for MBLE and TXMT (Table 2). Tiller production in TBNT was influenced to a lesser extent.

Second crop yields were higher when postdrain applications of N were followed by additional N applied after main crop harvest. A single application of 120 lb N/A was more efficient and resulted in grain yields comparable with the split applications. When 60 lb N/A were applied to the second crop only, yields were as good or higher than those where N was applied to the main crop prior to harvest.

It is questionable whether late main crop heading applications of N significantly influence milling yields. Milling was unaffected in 1990 but some differences were measured in 1991. Since the overall milling yields in both years were generally poor, any influence due to N applied as in this study may not be real.

A single application of 60 lb N/A after main crop harvest appears to be as efficient as a single postheading application. When additional N in the second crop follows a postheading N application, a yield response does occur. Similar yields can be obtained by applying the total amount to the second crop in a single application.

Table 1. Effect of N rate, timing, and split application on ratoon performance and second crop grain yields. Rice Research Station, Crowley, LA. 1991.

		Plant height				Main crop grain yields at 12% moisture				Milling yields			
Postheading* N application	Ratoon** N	TBNT	MBLE	TXMT	N MEAN	TBNT	MBLE	TXMT	N Mean	TBNT	MBLE	TXMT	Mean
-------(lb/A)--------		-----------(cm)----------				-----------(lb/A)-----------				------(% head - % total)-----			
60 8d predrain	0	118	85	80	94	8422	7179	7231	7611	59-72	41-72	46-71	49-72
60 4d predrain	0	116	86	80	94	7800	7490	7259	7517	60-72	40-72	47-72	49-72
60 4d postdrain	0	116	87	80	95	8212	7515	7628	7785	58-72	40-72	50-71	49-71
60 8d postdrain	0	118	86	79	94	8127	7386	7333	7615	57-71	40-72	47-71	48-71
60 8d predrain	60	118	86	80	94	8004	7291	7518	7604	58-71	38-71	47-71	47-71
60 4d predrain	60	117	89	81	96	8349	7539	7326	7738	59-71	40-71	46-71	48-71
60 4d postdrain	60	116	86	79	94	7184	7216	7192	7197	59-71	41-72	48-71	49-72
60 8d postdrain	60	118	84	79	94	8266	7022	7236	7508	60-72	41-72	49-71	50-71
0	60	117	85	80	94	8014	7392	7317	7574	59-71	37-72	47-71	48-71
0	120	117	86	80	95	8378	7537	7288	7734	57-71	37-72	46-71	47-71
Variety mean		117	86	80		8076	7357	7333		59-71	39-72	47-71	
C.V., %			3.19				4.42				(4.45 - 0.59)		
LSD (0.01):													
Variety				3				273			4	ns	
Nitrogen				ns				272			2	ns	
N within V				ns				625			4	ns	
N across V				6				649			5	ns	

* Nitrogen was applied postheading at 8, 4, 4, and 8 days pre- and postharvest drainage.

** Ratoon N was applied immediately after harvest and prior to flood application.

Table 2. Effect of N rate, timing, and split application on ratoon performance and second crop grain yields. Rice Research Station, Crowley, LA. 1991.

		Tillers				Second crop grain yields at 12% moisture				Total grain yields at 12% moisture			
Postheading* N application	Ratoon** N	TBNT	MBLE	TXMT	N Mean	TBNT	MBLE	TXMT	N Mean	TBNT	MBLE	TXMT	N Mean
-------(lb/A)--------		-------(no/9ft^2)------				-----------(lb/A)-----------				-----------(lb/A)-----------			
60 8d predrain	0	310	495	531	445	1470	2151	2417	2013	9893	9330	9648	9624
60 4d predrain	0	355	481	542	460	1502	2395	2491	2130	9303	9886	9751	9646
60 4d postdrain	0	337	538	549	475	1583	2694	2437	2238	9795	10209	10065	10023
60 8d postdrain	0	319	580	612	504	1704	2972	2743	2473	9831	10357	10076	10088
60 8d predrain	60	373	535	592	500	2074	2929	3029	2677	10078	10220	10547	10282
60 4d predrain	60	371	610	623	535	1898	3251	2876	2675	10248	10790	10203	10414
60 4d postdrain	60	310	583	616	503	1595	3218	2469	2428	8779	10435	9661	9625
60 8d postdrain	60	355	567	621	514	1718	3294	2719	2577	9983	10315	9955	10085
0	60	277	495	567	446	1786	2994	2849	2543	9799	10387	10166	10117
0	120	315	549	576	480	1860	3425	2779	2688	10238	10961	10067	10422
Variety mean		332	543	583		1719	2932	2681		9795	10289	10014	
C.V., %			9.15				10.56				4.90		
LSD (0.01):													
Variety			72				253				440		
Nitrogen			48				278				530		
N within V			83				482				918		
N across V			105				518				969		

* Nitrogen was applied postheading at 8, 4, 4, and 8 days pre- and postharvest drainage.

** Ratoon N was applied immediately after harvest and prior to flood application.

TIMING OF MIDSEASON NITROGEN IN DRILL-SEEDED RICE

P.K. Bollich, W.J. Leonards, Jr., G.R. Romero,
and D.M. Walker

Two studies were conducted at the Rice Research Station to compare midseason N management strategies in drill-seeded rice. One study involved a comparison among a single preflood, a two-way, and a three-way split of urea-N. The second study compared a three-way split of urea-N when applied at two different times of application.

Approximately 60 lb/A P_2O_5 and K_2O were banded 2 inches deep into a well-prepared seedbed. The varieties Lemont and Tebonnet were planted in the first study while Lemont and Newbonnet were planted in the second study. All varieties were seeded at a rate of 100 lb/A. The test areas were flushed once after emergence. Retainers were placed into each plot and fertilized with ^{15}N labelled urea to determine total N uptake. Urea was broadcast onto the soil surface in the remainder of the plot areas and a shallow, permanent flood was established.

In the Lemont-Tebonnet study, a total of 120 lb N/A was applied either as (1) a single preflood application, (2) a two-way split with 90 lb N preflood and the remainder at panicle initiation (PI), or (3) a three-way split with 60 lb N preflood, 30 lb N at panicle initiation, and the remaining 30 lb at panicle differentiation (PD).

In the Lemont-Newbonnet study, N was applied as a three-way split in all treatments. A 120 or 75 lb preflood N application was applied to Lemont and Newbonnet, respectively. Each variety received 60 lb N/A applied in two equal splits at (1) PI and PI plus 10 days and (2) PD and PD plus 10 days.

Whole plant samples were collected from each retainer at full heading to determine total N uptake. Pest control (weeds, insects, disease) was practiced when necessary. Individual whole plots were combine-harvested at field maturity. Days to 50% heading, whole plant weight, plant height, and grain yield were determined.

Experiment: Midseason N timing study

Location: Rice Research Station

Soil Type/Analysis: Crowley silt loam; pH: 6.7; O.M.: 1.07%; extractable nutrients (mg/kg): P-30, Na-51, K-75, Ca-1185, Mg-206, Zn-0.54, S-3.77, As-2.53, Fe-42.24

Variety/Seeding Rate: LMNT, TBNT, 100 lb/A

Planting Method/Date: Drill-seeded, Apr 9

Fertilization: 60 lb/A P_2O_5 and K_2O, Apr 9; preflood urea treatments, May 13; midseason splits according to growth stage

Plot Size: 7 x 25 ft (175 ft^2)

Emergence Date: TBNT, Apr 17; LMNT, Apr 18

Water Management: Flushed, Apr 23; permanent flood, May 13; harvest drainage, July 26; second crop flooded, Aug 6; harvest drainage, Oct 11

Herbicides: 3.5 lb ai/A Stam (propanil), May 1; 3.0 lb ai/A Ordram (molinate), May 20; 0.9 oz ai/A Londax (bensulfuron-methyl), May 22

Insecticides: 0.6 lb ai/A Furadan (carbofuran), May 31

Fungicides: 0.5 lb ai/A Benlate (benomyl), June 17, July 2

Harvest: Main crop, Aug 6; second crop, Nov 2

Experimental Design: Randomized complete block with four replications, factorial arrangement of treatments

Comments: Visual response to preflood urea treatments occurred within 5 days. During the later tillering stages, N deficiency was observed initially where only 60 lb urea-N/A were applied preflood. Plant height, main crop, and second crop grain yields decreased significantly when N was applied as a three-way split (Table 1). The preflood N application in the three-way split did not maintain the rice plants until PI and the resulting deficiency decreased yields. There were no differences in total biomass due to N split. Total N uptake results will be available upon completion of analysis.

Table 1. Influence of midseason N timing on agronomic performance of drill-seeded Lemont and Tebonnet rice. Rice Research Station, Crowley, LA. 1991.

				Grain yield at 12% moisture			
Variety	Time and rate*	Days to 50% heading	Plant height	Main crop	Second crop	Total	Whole plant weight
	(lb/A)		(cm)	(lb/A)			($g/3ft^2$)
Lemont	120 PF	88	76	6589	1720	8309	245
Tebonnet	120 PF	83	117	6994	1613	8607	285
Lemont	90PF|30PI	88	75	6358	1518	7876	246
Tebonnet	90PF|30PI	81	109	6855	1265	8119	295
Lemont	60PF|30PI|30PD	87	74	5972	1588	7560	241
Tebonnet	60PF|30PI|30PD	80	99	5859	1235	7095	276
C.V.%		0.57	4.68	7.20	13.40	7.18	7.72
				Main effects			
Variety:							
Lemont		88	75	6306	1609	7915	244
Tebonnet		81	108	6569	1371	7940	285
LSD (0.05)		1	4	ns	174	ns	18
Time and rate:							
Single pf		86	96	6792	1666	8458	265
Two-way		84	92	6606	1391	7998	271
Three-way		83	86	5915	1412	7327	259
LSD (0.05)		1	5	494	213	607	ns

* PF = preflood, PI = panicle initiation, PD = panicle differentiation.

Experiment: Midseason N timing study

Location: Rice Research Station

Soil Type/Analysis: Crowley silt loam; pH: 6.3; O.M.: 1.02%; extractable nutrients (mg/kg): P-28, Na-54, K-72, Ca-1046, Mg-197, Zn-0.54, S-4.23, As-2.95, Fe-42.55

Variety/Seeding Rate: LMNT, NWBT, 100 lb/A

Planting Method/Date: Drill-seeded, Apr 10

Fertilization: 60 lb/A P_2O_5 and K_2O, Apr 9; preflood urea treatments, May 7; midseason splits according to growth stage

Plot Size: 7 x 25 ft (175 ft^2)

Emergence Date: NWBT, Apr 17; LMNT, Apr 18

Water Management: Flushed, Apr 23; permanent flood, May 13; harvest drainage, July 27; second crop flooded, Aug 6; harvest drainage, Oct 11

Herbicides: 3.5 lb ai/A Stam (propanil), May 1; 3.0 lb ai/A Ordram (molinate), May 20; 0.9 oz ai/A Londax (bensulfuron-methyl), May 22

Insecticides: 0.6 lb ai/A Furadan (carbofuran), May 31

Fungicides: 0.5 lb ai/A Benlate (benomyl), June 17, July 2

Harvest: Main crop, Aug 6; second crop, Nov 2

Experimental Design: Randomized complete block with four replications, factorial arrangement of treatments

Comments: Visual response to preflood urea treatments occurred within 5 days. Lemont yield was significantly higher than Newbonnet (Table 2). Rotten neck blast reduced grain yield of Newbonnet in the main crop. Time of the midseason applications had no influence on any of the agronomic variables in this study. Total N uptake results will be available upon completion of analysis.

Table 2. Influence of midseason N timing on agronomic performance of drill-seeded Lemont and Newbonnet rice. Rice Research Station, Crowley, LA. 1991.

Variety	Time and rate*	Days to 50% heading	Plant height	Grain yield at 12% moisture: Main crop	Second crop	Total	Whole plant weight
	(lb/A)		(cm)	(lb/A)			(g/3ft^2)
Lemont	120PF|30PI|30PI+10	88	82	8045	2032	10076	344
Lemont	120PF|30PD|30PD+10	89	82	8132	2326	10458	331
Newbonnet	75PF|30PI|30PI+10	87	93	5901	1940	7841	326
Newbonnet	75PF|30PD|30PD+10	87	93	5826	1844	7671	303
C.V.%		0.60	2.70	4.48	5.75	3.87	5.88
				Main effects			
Variety:							
Lemont		88	82	8088	2179	10267	338
Newbonnet		87	93	5864	1892	7756	314
LSD (0.05)		1	3	353	132	395	22
Time and rate:							
PI splits		87	88	6973	1986	8959	335
PD splits		88	88	6979	2085	9064	317
LSD (0.05)		ns	ns	ns	ns	ns	ns

* PF = preflood, PI = panicle initiation, PD = panicle differentiation.

EVALUATION OF COATED CALCIUM CARBIDE AS A NITRIFICATION INHIBITOR IN DRILL-SEEDED TEXMONT RICE

P.K. Bollich, A.R. Mosier, K. Bronson, W.J. Leonards, Jr., G.R. Romero, and D.M. Walker

INTRODUCTION

Profitable rice production is greatly influenced by uptake and efficiency of fertilizer nitrogen (N). Nitrogen source, rate, time of application, placement, rice variety, water management, and environmental conditions influence efficiency of applied fertilizer N. Denitrification, volatilization, and leaching can lead to large losses of applied N and decreased grain yields with improper management of fertilizer N. In a dry-seeded cultural system, fertilizer N applied to a dry seedbed just prior to establishment of the permanent flood is efficiently utilized by the rice plant.

Proper application in relation to water management can have a significant influence on retention and availability of applied N. Some estimates, however, place losses as high as 30-70% of the total mineral N. A new nitrification inhibitor, coated calcium carbide (CCC), has shown promise in conserving N and increasing rice yield in transplanted rice. Losses of N from the nitrification-denitrification mechanism can be quite significant in flooded rice culture. Reduction in N losses from this mechanism would improve N retention in the soil, increase availability of N to the rice plant, and improve overall efficiency of fertilizer N.

The objective of this preliminary investigation was to evaluate the effectiveness of CCC in improving efficiency of urea-N by inhibiting nitrification.

MATERIALS AND METHODS

The long-grain semidwarf variety Texmont was used in the study. Approximately 60 lb/A P_2O_5 and K_2O were banded 2 inches deep, and Texmont was drill-seeded at the rate of 100 lb/A. The test area was flushed periodically for emergence and stand establishment. Urea-N with and without CCC was broadcast prior to permanently flooding 4 weeks after emergence. Rates of 60 and 120 lb N/A were applied for each material. Metal barriers were placed around all plots receiving CCC. Application rate of CCC was 18 kg CaC_2/A.

Pest control (weeds, insects, disease) was practiced when necessary. Individual whole plots were combine-harvested at field maturity. Days to 50% heading, plant height, grain moisture, grain yield, and whole plant yield components were determined.

Experiment: Nitrification (CCC) inhibitor study

Location: Rice Research Station

Soil Type/Analysis: Crowley silt loam; pH: 6.6; O.M.: 0.97%; extractable nutrients (mg/kg): P-30, Na-62, K-71, Ca-1156, Mg-207, Zn-0.61, S-3.55, As-4.59, Fe-45.58

Variety/Seeding Rate: TXMT, 100 lb/A

Planting Method/Date: Drill-seeded, Apr 9

Fertilization: 60 lb/A P_2O_5 and K_2O ppi; N source, urea with and without CCC

Plot Size: 7 x 25 ft (175 ft^2)

Emergence Date: Apr 18

Water Management: Flushed, Apr 23; flooded, May 13; harvest drainage, July 26

Herbicides: 3.5 lb ai/A Stam (propanil), May 1; 3.0 lb ai/A Ordram (molinate), May 20; 0.9 oz ai/A Londax (bensulfuron-methyl), May 22

Insecticides: 0.6 lb ai/A Furadan (carbofuran), May 31

Fungicides: 0.5 lb ai/A Benlate (benomyl), June 17, July 2

Harvest: Aug 16

Experimental Design: Randomized complete block with four replications of eight treatments

Comments: Response to preflood N was observed within 5 days of application. Deficiency symptoms were observed at midseason at the lower rate of N. The inhibitor did not influence plant height or grain yield (Table 1). Grain yields increased significantly as rate of N increased. Whole plant and grain weight were decreased when CCC was applied. Most of the inhibitor floated throughout the season which probably reduced its effectiveness, since complete breakdown of the product did not occur. There also appeared to be some antagonism between the inhibitor and the herbicide Ordram since phytotoxicity was observed where CCC was applied. The decreased whole plant and grain weight measurements in the inhibitor treatments could have been related to this injury rather than to the inhibitor.

Table 1. Influence of nitrogen rate and nitrification inhibitor on agronomic performance of drill-seeded Texmont rice. Rice Research Station, Crowley, LA. 1991.

Source	Rate	Days to 50% heading	Plant height	Grain yield	Whole plant weight	Grain weight
	(lb/A)		(cm)	(lb/A)	----($g/3ft^2$)----	
Control	0	71	57	3527	234	125
Urea	60	70	63	5136	345	179
Urea	120	72	70	6565	461	236
Urea+CCC	60	72	63	4912	341	169
Urea+CCC	120	72	70	6298	406	206
CCC	0	70	56	3469	195	107
C.V.%		2.51	4.25	7.62	9.28	9.91
LSD (0.05)		ns	4	572	46	25

CONTROLLED-RELEASE UREA FERTILIZER STUDY

P.K. Bollich, W.J. Leonards, Jr., G.R. Romero, and D.M. Walker

A study was conducted at the Rice Research Station in Crowley, LA to evaluate the effectiveness of a controlled-release urea fertilizer in drill-seeded rice. Meister urea fertilizer was developed by the Chisso Corporation and is currently in use in crops such as soybeans, vegetables, turf grass, trees, and rice in Japan.

Various timed-release formulations of Meister were applied as a single, preplant application in drill-seeded Lemont rice. The formulations included Meister 10, 15, and 20 which correspond to 100, 150, and 200 day release properties, respectively. These formulations were compared with urea applied in split applications according to currently recommended practices. All sources of N were applied at rates of 0, 50, 100, 150, and 200 lb/A. Meister formulations were applied as single preplant applications.

Approximately 60 lb/A of P_2O_5 and K_2O were incorporated prior to seeding. The Meister formulations were surface applied and the test area was drill-seeded. At least 60% of the Meister urea was incorporated during the planting operation. There was no movement of any of the material remaining on the soil surface during flush irrigations prior to permanent flood establishment.

The urea fertilizer was applied in split applications with the exception of the 50 lb/A rate which was applied as a single preflood application. The 100 lb/A rate was split 70-30 with the initial amount being applied preflood and the remainder at panicle initiation. The 150 lb/A rate was applied as a 90-30-30 split (preflood + panicle initiation + panicle differentiation) and the 200 lb/A rate as a 120-40-40 split in a similar fashion. Plant samples were collected at harvest maturity to determine biomass production and N uptake. The test area was reflooded after harvest for ratoon production to evaluate the potential for N carryover from the Meister formulations.

Experiment: Controlled-release urea study

Location: Rice Research Station

Soil Type/Analysis: Crowley silt loam; pH: 6.1; O.M.: 1.07%; extractable nutrients (mg/kg): P-29, Na-57, K-69, Ca-952, Mg-191, Zn-1.64, S-5.26, As-2.71, Fe-82.30

Variety/Seeding Rate: LMNT, 100 lb/A

Planting Method/Date: Drill-seeded, Apr 10

Fertilization: 60 lb/A P_2O_5 and K_2O, Apr 9; Meister treatments, Apr 10; Preflood urea treatments, May 7; midseason splits according to growth stage

Plot Size: 7 x 25 ft (175 ft^2)

Emergence Date: Apr 18

Water Management: Flushed, Apr 23; permanent flood, May 8; harvest drainage, July 27; ratoon flooded, Aug 6; harvest drainage, Oct 11

Herbicides: 3.5 lb ai/A Stam (propanil), May 1; 3.0 lb ai/A Ordram (molinate), May 20; 0.9 oz ai/A Londax (bensulfuron-methyl), May 22

Insecticides: 0.6 lb ai/A Furadan (carbofuran), May 31

Fungicides: 0.5 lb ai/A Benlate (benomyl), June 17, July 2

Harvest: Aug 6, Nov 2

Experimental Design: Randomized complete block with four replications, N rate assigned to main plot and source to subplot

Comments: A visual response to the preplant Meister treatments was observed 2 weeks after emergence. Visual response to preflood urea treatments occurred within 5 days. During the later tillering stages, N deficiency was observed initially where only 50 lb urea-N/A were applied preflood. The Meister formulations also displayed mild N deficiency at the lower rates of application. Overall growth and color were obviously better at the higher rates of N for all sources. Delayed heading occurred where no N was applied (Table 1). The Meister formulations did not appear to influence heading regardless of rate. The urea treatments delayed heading when the N rate was 100 lb/A or higher. Plant height was not influenced by either source or rate. Biomass increased as rate of N increased for all sources. Significantly more biomass was produced with the Meister 10 and 15 formulations when compared with urea. Meister 15 also produced more biomass than did Meister 20, indicating the difference in release between the two. Estimates of N uptake in the whole plant samples will be available at a later date.

A significant source by N rate interaction occurred for main crop grain yield. The response to rate of N was variable with respect to source. Optimum grain yield occurred at a N rate of 150 lb/A for all sources except Meister 15. Slight yield reductions were observed at a higher rate of N. When only 100 lb N/A were applied, the Meister 10 produced more grain than an equivalent rate of urea. At the highest rate of 200 lb/A, all formulations of Meister outyielded urea.

Ratoon yields increased as rate of main crop N increased for the Meister formulations (Table 2). This indicates that either some N was still being released to the ratoon or that there was additional nutrient accumulation in the main crop not utilized. Yields tended to increase with the Meister formulations as N increased to 200 lb/A, especially with Meister 20. Ratoon response to increasing urea-N was somewhat different with no increase in yield occurring above 100 lb N/A in the main crop.

Since ratoon yields generally increased as rate of Meister N increased to 200 lb/A, total grain yields also reflect the influence of potential carryover N. Average total yield was significantly higher for Meister 20 when compared with either Meister 10 or urea. At a 150 lb/A N rate, the Meister 20 significantly outyielded urea in total grain yield.

There appears to be potential for use of a urea formulation where release of N can be controlled as with this Meister product. It will be important for the N release to be synchronized with plant growth for maximum benefit, especially where ratoon production is not practiced and carryover N may be undesireable. In this particular study, the Meister 15 formulation appeared to best fit into traditional fertilizer N management in drill-seeded rice. Meister 15 applied at a rate of 100 lb/A behaved very similar to urea applied at 150 lb/A with respect to grain yield. The overall differences due to source of N were also generally small and indicate the potential for applying Meister formulated urea as a single preplant application in drill-seeded rice.

Table 1. Effect of N source and rate on agronomic performance of drill-seeded Lemont rice. Rice Research Station, Crowley, LA. 1991.

	N source																			
	Days to 50% heading					Plant height					Whole plant					Grain yield at 12% moisture				
N rate	M10	M15	M20	Urea	N Mean	M10	M15	M20	Urea	N Mean	M10	M15	M20	Urea	N Mean	M10	M15	M20	Urea	N Mean
(lb/A)						----------(cm)-----------					----------($g/3ft^2$)----------					-------------(lb/A)------------				
0	88	89	89	89	89	72	71	69	72	71	273	270	227	261	258	4174	4409	4125	4377	4386
50	83	84	84	84	84	73	74	74	75	74	416	409	407	407	410	6187	6527	6304	6750	6442
100	83	83	83	86	84	74	75	78	76	76	446	545	526	420	484	7256	7841	7597	7423	7530
150	83	83	83	86	84	81	83	80	78	81	542	558	521	510	533	8233	8198	8203	7984	8155
200	83	84	83	89	85	83	79	78	78	80	578	588	539	504	552	8215	8063	8040	7611	7982
Source Mean	84	85	85	87		77	76	76	76		451	474	444	420		6905	7008	6854	6829	
C.V., %			0.95					5.77					9.97					4.15		
LSD (0.05):																				
Nitrogen			1					ns					42					397		
Source			1					ns					28					ns		
S within N			1					ns					64					406		
S across N			2					ns					69					530		

Table 2. Effect of main crop N source and rate on the ratoon production of drill-seeded Lemont rice. Rice Research Station, Crowley, LA. 1991.

	N source														
	Main crop grain yield at 12% moisture					Ratoon crop grain yield at 12% moisture					Total grain yield at 12% moisture				
N rate	M10	M15	M20	Urea	N Mean	M10	M15	M20	Urea	N Mean	M10	M15	M20	Urea	N Mean
(lb/A)	(lb/A)														
0	4174	4409	4125	4377	4386	1293	1364	1367	1233	1314	5925	5773	5492	5610	5700
50	6187	6527	6304	6750	6442	1575	1658	1818	1721	1693	7762	8186	8122	8471	8135
100	7256	7841	7597	7423	7530	1842	1853	2091	2033	1955	9099	9694	9688	9457	9484
150	8233	8198	8203	7984	8155	2002	2159	2374	2060	2149	10235	10357	10577	10044	10303
200	8215	8063	8040	7611	7982	2172	2295	2726	2087	2320	10388	10358	10766	9698	10302
Source															
Mean	6905	7008	6854	6829		1777	1866	2075	1827		8682	8874	8929	8656	
C.V., %			4.15					8.19					3.49		
LSD (0.05):															
Nitrogen			397					180					497		
Source			ns					98					195		
S within N			406					220					436		
S across N			530					262					624		

CONSERVATION TILLAGE STUDIES

P.K. Bollich, W.J. Leonards, Jr., G.R. Romero,
and D.M. Walker

Studies relating to conservation tillage conducted in 1991 included a variety by tillage evaluation and a preplant herbicide burndown evaluation. Both studies were conducted in a drill-seeded cultural system.

In the variety by tillage evaluation Maybelle, Mars, and Lemont were planted into conventional, no-till, and spring and fall prepared stale seedbeds. Soybeans had been grown the previous year. Seedbed preparation consisted of disking followed by conditioning with a roller harrow. Approximately 60 lb/A P_2O_5 and K_2O were incorporated at the time of seedbed preparation in each tillage system except the no-till in which these fertilizer nutrients were applied preflood. Existing vegetation was burned down with Roundup prior to planting. The majority of N was applied preflood and the remainder as a midseason topdress. Water samples were collected at three times during the season and analyzed for BOD (biological oxygen demand), EC (electrical conductivity), pH, TSS (total suspended solids), TDS (total dissolved solids), TS (total solids), anions, and cations. Samples were also collected at harvest drain for pesticide residue analyses.

In the preplant burndown study Roundup D-Pak (glyphosate) and Gramoxone E (paraquat dichloride) were evaluated alone and in combination with either Goal (oxyfluorfen) or Facet (quinclorac) when applied 3 and 6 weeks preplant. All treatments were applied with 1% Triton AG98 surfactant. Treatment combinations and rates of application are shown in Table 5. Treatments were rated for % control at the time of planting.

Experiment: Variety x tillage study

Location: Rice Research Station, South Unit

Soil Type/Analysis: Crowley silt loam; pH: 6.1; O.M.: 1.19%; extractable nutrients (mg/kg): P-33, Na-57, K-96, Ca-1269, Mg-271, Zn-1.87, S-5.35, As-6.88, Fe-232.4

Variety/Seeding Rate: MBLE, LMNT, MARS, 110 lb/A

Planting Method/Date: Drill-seeded, Apr 24

Fertilization: 60 lb/A P_2O_5 and K_2O; 90 lb N/A (urea) pf, May 20; 55 lb N/A topdress, June 14

Plot Size: 10.7 x 258 ft (2752 ft^2)

Emergence Date: MBLE, MARS, May 3; LMNT, May 4

Water Management: Flushed, May 4; permanent flood, May 21; harvest drainage, Aug 9

Herbicides: 1.0 lb ai/A Roundup (glyphosate), Apr 8; 5.0 lb ai/A Stam (propanil), May 19; 3.5 lb ai/A Ordram (molinate), May 25; 0.9 oz ai/A Londax (bensulfuron-methyl), June 5

Insecticides: 0.6 lb ai/A Furadan (carbofuran), May 31

Fungicides: None

Harvest: Aug 21-22

Experimental Design: Randomized complete block with four replications, tillage treatment assigned to main plot and variety to subplot

Comments: Stand establishment was uniform across seedbed treatments. Roundup gave good control of vegetation prior to planting. Although stands were reduced slightly in the fall stale and no-till seedbeds, stand was more than adequate (Table 1). One application of Stam preflood plus an application of Ordram were required to control dayflower and annual grasses. Grain yields were reduced about 10% for all varieties when planted into fall stale and no-till seedbeds. Since stands were adequate in all tillage methods, the reduction in yield may have been due to slightly less efficient utilization of fertilizer N, especially during the preflood application. Seedbeds were much more compacted with fall stale and no-till preparation and may have hindered movement of fertilizer N into the root zone during permanent flood establishment.

Evaluations of water quality parameters are in Tables 2, 3, and 4. In general, most of the measurements among tillage methods were not significantly different. In the initial drain samples, the most important difference was in TSS. This parameter was significantly higher in the conventional and spring prepared stale seedbeds. TDS and TS were not measured at this sampling. Cl^- was significantly higher in water released from a conventionally prepared seedbed, while Br^-, NO_3^-, and SO_4^- were higher in both the conventional and stale seedbeds.

In the midseason drain sample, EC, TDS, and TS were higher in the no-till seedbed than in the conventional seedbed. Mg, S, Ca, F^-, Cl^-, and PO_4^{3-} were also higher in the no-till seedbed when compared to conventional preparation.

There were few differences observed in the harvest drain water samples. Si and S were higher in the conventional seedbed than in the no-till while Cl^- was highest in the no-till treatment.

Water samples from harvest drain and soil samples were also collected for analysis of pesticide residue from the pesticides Stam, Ordram, and Furadan. Results from these samples are not available at this time.

Table 1. Effect of seedbed preparation on agronomic performance of drill-seeded rice varieties. Rice Research Station, South Unit, Crowley, LA. 1991.

	Stand density				Days to 50% heading				Plant height				Grain yield at 12% moisture			
Tillage	MBLE	LMNT	MARS	Mean	MBLE	LMNT	MARS	Mean	MBLE	LMNT	MARS	Mean	MBLE	LMNT	MARS	Mean
	---- (plants/ft^2) ----								---------(cm)---------				-----------(lb/A)-----------			
Conventional	36	30	37	34	68	82	79	76	93	79	103	91	5775	5689	6277	5914
Spring stale	34	32	41	36	68	82	78	76	91	79	103	91	5679	5719	6421	5940
Fall stale	31	29	29	30	68	84	79	77	91	80	101	91	5225	5150	6007	5460
No till	29	28	32	30	69	84	79	77	87	77	99	88	5226	5095	6028	5449
Variety																
Mean	32	30	35		68	83	79		90	79	102		5476	5413	6183	
C.V., %		9.50				1.16				3.12				3.55		
LSD (0.01):																
Tillage			4				1				ns				578	
Variety			3				1				3				200	
V within T			6				2				6				400	
V across T			6				2				7				663	

Table 2. Influence of tillage on water quality of rice field floodwater (initial drain) from drill-seeded rice. Rice Research Station, South Unit, Crowley, LA. 1991.

Parameter	Conventional	Spring Stale	Fall Stale	No-till	LSD (0.05)
BOD5 (mg/L)	1	2	2	3	ns
pH	8.16	8.20	7.89	7.92	ns
EC (dS/m)	0.318	0.292	0.338	0.326	ns
TSS (mg/L)	192	179	113	113	64.06
TDS (mg/L)	-	-	-	-	-
TS (mg/L)	-	-	-	-	-
Fe (mg/L)	0.534	1.237	0.426	0.655	ns
Mn (mg/L)	0.004	0.010	0.000	0.001	ns
Ni (mg/L)	0.009	0.007	0.013	0.014	ns
Al (mg/L)	1.403	3.488	1.072	1.690	ns
Cd (mg/L)	0.000	0.000	0.000	0.000	ns
Cu (mg/L)	0.001	0.000	0.008	0.008	ns
As (mg/L)	0.000	0.000	0.000	0.000	ns
B (mg/L)	0.052	0.052	0.046	0.045	ns
Cr (mg/L)	0.000	0.000	0.000	0.000	ns
Si (mg/L)	7.198	10.574	7.780	8.605	ns
P (mg/L)	0.019	0.076	0.017	0.000	0.05
Pb (mg/L)	0.000	0.000	0.000	0.000	ns
Zn (mg/L)	0.011	0.012	0.013	0.010	ns
Mg (mg/L)	8.033	7.018	9.096	8.390	ns
K (mg/L)	2.274	2.387	3.667	3.435	1.14
S (mg/L)	1.754	1.500	1.138	1.103	0.21
Na (mg/L)	40.38	37.76	41.17	39.77	ns
Ca (mg/L)	18.60	15.95	21.44	19.41	ns
F^- (mg/L)	0.420	0.342	0.212	0.225	ns
Cl^- (mg/L)	25.03	19.82	22.23	21.56	2.50
Br^- (mg/L)	0.127	0.010	0.010	0.010	0.06
NO_3^- (mg/L)	3.332	2.237	2.440	2.007	0.75
PO_4^{3-} (mg/L)	0.097	0.062	0.157	0.080	ns
SO_4^{2-} (mg/L)	3.702	2.930	1.550	1.315	0.43

Table 3. Influence of tillage on water quality of rice field floodwater (midseason drain) from drill-seeded rice. Rice Research Station, South Unit, Crowley, LA. 1991.

Parameter	Conventional	Spring Stale	Fall Stale	No-till	LSD (0.05)
BOD5 (mg/L)	-	-	-	-	-
pH	7.89	7.84	7.90	7.93	ns
EC (dS/m)	0.221	0.238	0.271	0.301	0.05
TSS (mg/L)	29	24	30	25	ns
TDS (mg/L)	141	152	174	193	32.43
TS (mg/L)	170	176	204	218	33.38
Fe (mg/L)	0.153	0.164	0.051	0.028	0.05
Mn (mg/L)	0.000	0.000	0.000	0.000	ns
Ni (mg/L)	0.004	0.007	0.000	0.002	ns
Al (mg/L)	0.363	0.400	0.071	0.000	0.14
Cd (mg/L)	0.000	0.002	0.001	0.001	ns
Cu (mg/L)	0.006	0.011	0.007	0.013	ns
As (mg/L)	0.000	0.000	0.009	0.000	ns
B (mg/L)	0.049	0.061	0.053	0.050	ns
Cr (mg/L)	0.000	0.000	0.000	0.000	ns
Si (mg/L)	4.871	5.355	6.591	1.768	1.60
P (mg/L)	0.050	0.076	0.230	0.338	0.22
Pb (mg/L)	0.000	0.000	0.000	0.000	ns
Zn (mg/L)	0.002	0.005	0.001	0.004	ns
Mg (mg/L)	7.199	7.624	9.371	9.823	1.85
K (mg/L)	0.372	0.951	1.262	4.145	0.86
S (mg/L)	0.560	0.721	0.544	1.091	0.23
Na (mg/L)	22.43	24.74	26.63	26.12	ns
Ca (mg/L)	20.14	20.78	24.59	28.72	2.72
F^- (mg/L)	0.220	0.222	0.242	0.487	0.06
Cl^- (mg/L)	11.23	13.61	13.28	19.52	4.93
Br^- (mg/L)	0.050	0.010	0.047	0.132	ns
NO_3^- (mg/L)	1.150	1.830	0.890	0.010	ns
PO_4^{3-} (mg/L)	0.050	0.050	0.050	0.637	0.34
SO_4^{2-} (mg/L)	0.802	1.395	0.312	1.567	ns

Table 4. Influence of tillage on water quality of rice field floodwater (harvest drain) from drill-seeded rice. Rice Research Station, South Unit, Crowley, LA. 1991.

Parameter	Conventional	Spring Stale	Fall Stale	No-till	LSD (0.05)
BOD5 (mg/L)	1	1	1	1	ns
pH	7.66	7.63	7.48	7.47	ns
EC (dS/m)	0.296	0.307	0.321	0.363	ns
TSS (mg/L)	16	9	28	41	ns
TDS (mg/L)	190	196	205	232	ns
TS (mg/L)	206	205	233	274	ns
Fe (mg/L)	0.028	0.031	0.036	0.028	ns
Mn (mg/L)	0.000	0.000	0.000	0.000	ns
Ni (mg/L)	0.000	0.000	0.001	0.000	ns
Al (mg/L)	0.000	0.000	0.000	0.000	ns
Cd (mg/L)	0.000	0.000	0.000	0.000	ns
Cu (mg/L)	0.025	0.026	0.023	0.024	ns
As (mg/L)	0.000	0.000	0.009	0.000	ns
B (mg/L)	0.077	0.082	0.083	0.080	ns
Cr (mg/L)	0.000	0.000	0.000	0.000	ns
Si (mg/L)	7.752	7.704	4.733	3.044	3.02
P (mg/L)	0.084	0.189	0.082	0.132	ns
Pb (mg/L)	0.000	0.000	0.000	0.000	ns
Zn (mg/L)	0.007	0.009	0.008	0.011	ns
Mg (mg/L)	9.473	9.757	10.192	11.345	ns
K (mg/L)	2.912	3.286	1.645	1.155	0.70
S (mg/L)	0.749	1.083	0.744	0.664	ns
Na (mg/L)	35.49	34.37	37.59	44.32	ns
Ca (mg/L)	14.17	14.80	15.70	16.35	ns
F^- (mg/L)	0.327	0.307	0.305	0.417	0.06
Cl^- (mg/L)	23.34	24.16	22.03	28.87	4.58
Br^- (mg/L)	0.290	0.270	0.282	0.257	ns
NO_3^- (mg/L)	0.295	0.285	0.567	0.582	ns
PO_4^{3-} (mg/L)	0.050	0.050	0.050	0.050	ns
SO_4^{2-} (mg/L)	1.170	2.032	1.220	0.732	ns

__Experiment:__ Preplant burndown study

__Location:__ Rice Research Station, South Unit

__Soil Type/Analysis:__ Crowley silt loam; pH: 5.8; O.M.: 1.50%; extractable nutrients (mg/kg): P-60, Na-46, K-101, Ca-1150, Mg-282, Zn-1.99, S-4.92, As-2.67, Fe-80.78

__Variety/Seeding Rate:__ LMNT, 110 lb/A

__Planting Method/Date:__ Drill-seeded, Apr 24

__Fertilization:__ 60 lb/A P_2O_5 and K_2O; 90 lb N/A (urea) pf, May 20; 55 lb N/A topdress, June 14

__Plot Size:__ 10.7 x 25 ft (268 ft^2)

__Emergence Date:__ May 5

__Water Management:__ Flushed, May 4; permanent flood, May 21; harvest drainage, Aug 9

__Herbicides:__ 1.0 lb ai/A Roundup (glyphosate), Apr 8; 5.0 lb ai/A Stam (propanil), May 19; 3.5 lb ai/A Ordram (molinate), May 25; 0.9 oz ai/A Londax (bensulfuron-methyl), June 5

__Insecticides:__ 0.6 lb ai/A Furadan (carbofuran), May 31

__Fungicides:__ None

__Harvest:__ Aug 22

__Experimental Design:__ Randomized complete block with four replications, factorial arrangement of herbicide treatment and application time

__Comments:__ Control of vegetation prior to seeding was much better in treatments applied 3 weeks before planting. Significant regrowth occurred when treatments were applied 6 weeks preplant, especially when Roundup or Gramoxone was applied alone (Table 5). The residual herbicides gave additional control in all combinations. Weather problems delayed any additional preflood herbicide applications and permanent flood establishment. It was necessary to apply Ordram and Londax after flood establishment to all treatments due to severe weed pressure. Grain yields were significantly lower when herbicide treatments were applied 6 weeks preplant. Yields were also lower where Roundup and Gramoxone alone were applied, the result of weed establishment after burndown. Yields were higher when these herbicides were used in combination with Goal and Facet. There was also a significant difference in yield between Goal and Facet tank mixes, with the Facet combinations being more effective.

Table 5. Preplant burndown evaluation in no-till, drill-seeded Lemont rice. Rice Research Station, South Unit, Crowley, LA. 1991.

Herbicide	Time of application	Rate	% Control*	Days to 50% heading	Plant height	Grain yield at 12% moisture
	(weeks preplant)	(lb ai/A)			(cm)	(lb/A)
Roundup	6	1.0	64	81	65	2822
Gramoxone	6	.63	33	81	65	3155
Roundup + Goal	6	1.0 + .25	79	81	67	3363
Gramoxone + Goal	6	.63 + .25	70	81	70	4257
Roundup + Facet	6	1.0 + .5	83	81	71	5012
Gramoxone + Facet	6	.63 + .5	65	82	73	5374
Roundup	3	1.0	98	82	71	4726
Gramoxone	3	.63	95	82	70	4831
Roundup + Goal	3	1.0 + .63	98	83	72	5271
Gramoxone + Goal	3	.63 + .25	95	82	73	5336
Roundup + Facet	3	1.0 + .5	99	83	79	6408
Gramoxone + Facet	3	.63 + .5	97	83	74	6159
C.V.%			12.38	0.77	5.70	13.5
			Main effects			
Time of application:						
6 week preplant			65	81	69	4020
3 week preplant			97	83	73	5455
LSD (0.05)			6	1	2	376
Herbicide:						
Roundup			81	82	68	3841
Gramoxone			64	82	68	3993
Roundup + Goal			88	82	70	4317
Gramoxone + Goal			82	82	72	4797
Roundup + Facet			91	82	75	5710
Gramoxone + Facet			81	82	74	5766
LSD (0.05)			10	ns	4	651

* Ratings at time of planting based on % of area where vegetation is dead.

FOUNDATION SEED RICE PROGRAM

Lawrence M. White, III

INTRODUCTION

Foundation seed rice has been produced by the Rice Research Station for distribution to Louisiana farmers since 1949. The station's seed rice program was instituted in response to the critical shortage of pure planting stocks which existed during and after World War II. Since its inception, the program has made available to Louisiana growers over 106,000 cwt. of pedigreed stock of 24 rice varieties.

Concurrent with the distribution of pure seed by the Rice Research Station, there developed in Louisiana an industry comprised of independent seed dealers through whom farmers could conduct trade in registered and certified classes of pedigreed rice.

Foundation seed rice, the planting stock from which registered and certified seed are produced, is the farmers link with the work of the plant breeder. It is the product of hybridization and of successive generations of selection and testing to establish its value as crop seed and eventually as a commercial commodity. For this reason, foundation seed and the basic stocks from which it is produced, must be grown and conditioned in a manner which will insure that viability is maintained and that it be genetically pure and free from mechanical mixtures or contamination by noxious weeds.

Through the Rice Research Station's seed program, Louisiana farmers may obtain seed rice of improved varieties developed through the Louisiana Agricultural Experiment Station breeding program and of established commercial varieties originating either at Crowley or at research centers in neighboring states.

In order to fulfill the objectives of the seed program, the Rice Research Station utilizes the personnel, land, machinery, and other facilities needed to plant, harvest, condition, and store its annual seed rice crop. The production of breeder seed, planting stock for the foundation fields, and the maintenance of purity in commercial rice varieties are functions of the seed program. Breeder seed is sometimes grown within fields of foundation rice, or in a special nursery, set aside for propagating the Rice Research Station's seed stocks. The nursery also serves as a site for evaluating, purifying, and increasing selections from the Louisiana Agricultural Experiment Station breeding program which show promise as new varieties.

The distribution of pedigreed seed rice produced by the Rice Research Station is done according to a formula adopted by the Louisiana Seed Rice Growers Association. For each rice producing parish, the amount of seed allotted to an individual parish is determined by the percentage of the states total rice acreage grown in that parish during the previous crop year.

Personnel of the Louisiana Cooperative Extension Service in cooperation with parish committees of the Seed Rice Growers Association assist in the allocation of foundation seed rice. It is at the parish committee level that the allocation of seed to individual growers is decided. The county agents receive applications for seed rice from growers and handle information and publicity for the pure seed program.

In this state, the official seed certifying agency for all crops is the Louisiana Department of Agriculture. The rules and regulations pertaining to the certification of agricultural seeds are part of the Louisiana Seed Law. They are formulated by the Louisiana Seed Commission and enforced by Agronomic Programs Division of the Louisiana Department of Agriculture. Personnel of the Agronomic Programs Division, operating from district offices conduct field inspections of growing rice and sampling of bagged rice for laboratory analyses which consist of purity determinations and germination tests.

PRODUCTION PRACTICES

Each year, the Rice Research Station devotes approximately 80 acres of land to the production of foundation seed rice. In order to eliminate noxious weeds, especially red rice, which can disqualify rice from certification, the fields are fallowed for a 2-year period preceding planting. This also enables the fields to meet the crop history requirements specified in the seed rice regulations.

Following seedbed preparation, foundation fields are planted by means of a 16-runner grain drill. A basal application of fertilizer (20-60-60 lb/A of NPK) is made at the time of seeding. The breeder stock is planted at the rate of approximately 100 lb/A. The rice receives a preflood application of urea in which the rate of N may vary from 45 to 90 lb/A.

Seedling grasses and weeds are controlled by means of commercially available herbicides, applied by airplane. Similarly, aerial applications of insecticides are used to protect the fields from outbreaks of harmful insects.

Roguing of the rice fields for the removal of off-types, varietal mixtures, and noxious weeds, begins at the onset of heading and continues until the rice is harvested. During this interval, the headed rice is inspected by personnel of the Agronomic Programs Division to determine whether or not it meets minimum field standards of the certifying agency.

The rice is harvested with a conventional combine, and dried in the Rice Research Station's continuous flow drier to a moisture level of approximately 12% During the storage period between drying and cleaning, the rice is treated with an insecticide in order to protect it from stored-grain insects.

Cleaning of foundation and breeder seed usually commences in late October and continues until late December. The rice first moves through an air-and-screen cleaner which removes chaff, straw, and other foreign material and grades the grain according to width and thickness.

It then flows through two sets of length grading machines which consist of rotating, indented metal cylinders. The first set of cylinders removes stemmy rice, grains which have very long awns of which are attached to portions of the panicle. The second set removes small grains and broken or dehulled kernels of rice.

In the final phase of cleaning, the rice moves through a machine which performs diameter grading of the grain by means of rapidly oscillating perforated screens. This machine is designed to separate medium-grain and/or red rice from long-grain rice. It is also capable of removing shrivelled and other slender kernels from medium-grain rice.

From the cleaning machines, foundation and breeder seed rice flow directly into a treater which applies a measured quantity of liquid fungicide for protection of young rice plants from seedling disease. The rice is bagged as it comes from the treater, assigned a lot number, and placed in storage in the Station's seed rice warehouse where it remains until the time that it is distributed to Louisiana farmers.

The field and laboratory purity standards for foundation seed rice are very strict with regard to varietal mixtures and noxious weeds. In all phases of production, therefore, great care must be exercised in order to prevent these impurities from contaminating the seed stocks. To that end, it is routine procedure at the Rice Research Station to partially disassemble all planting and harvesting equipment and to clean it thoroughly with water an/or compressed air before using it in the field. The drier and cleaning plant, including all elevators and other conveying equipment, are also subjected to meticulous cleaning and inspection before and after having been used in stubble fields. Therefore, tractors, plows, harrows, and land levelers are carefully washed before they enter land which is in a fallow cycle. These measures, together with the inspection and roguing which are done during the growing season, help to insure that foundation seed is genetically pure and free of mechanical mixtures and noxious weed seeds.

1991 ACTIVITIES

Of the 2915 cwt. of foundation seed rice sold in March 1991, the varieties and quantities were as follows: Lemont, 1064 cwt.; Mars, 835 cwt.; Rico I, 730 cwt.; and Lacassine, 286 cwt.

The Rice Research Station's foundation seed crop in 1991 consisted of 19.67 acres of LA 2207, an experimental long-grain variety, later named Cypress, 17.00 acres of Lacassine, 14.28 acres of Lemont, 11.20 acres of Maybelle, and 9.85 acres of LA 2214, an experimental medium-grain variety, later named Bengal.

Breeder seed was grown in 1991 as follows: Lacassine, 1.5 acres; Maybelle, .75 acre; Lemont, .75 acre; Rosemont, .25 acre; and Toro-2, .25 acre.

Headrows of Maybelle, Cypress, Lacassine, Lemont, and Leah were also grown in 1991.

RICE PHYSIOLOGY

INTRODUCTION

Plant growth regulators (PGRs) have a tremendous effect on crop production because of their ability to alter plant growth and development. Therefore, studies of PGR modifications to plant growth and development which improve rice production were conducted.

In preliminary greenhouse and small plot trials, emergence has been improved with PGR seed treatments which cause mesocotyl and coleoptile elongation. These structures are short in some semidwarf cultivars, and seeding more than one inch below the soil surface can result in poor stands. Small plot seed treatment studies were continued in 1991. In addition, seedling height of semidwarf rice increases slowly resulting in poor seedling vigor. Seedling height was increased markedly in 1989 and 1990 and studies to increase seedling height with PGRs were conducted in 1991.

At present, PGRs have been identified which can modify internode elongation and modification of internode elongation can be beneficial. In some semidwarf varieties panicles are below the upper leaves at maturity. This increases the plant matter entering combines at harvest and decreases harvest efficiency. Plant growth regulators can increase upper stem elongation and raise panicles above the canopy for easier harvest. In contrast, research has shown PGRs can shorten plant stature by reducing internode elongation. In varieties susceptible to lodging because of tall stature, reductions in plant height by PGRs have been accomplished and have resulted in a greater tolerance of tall varieties to lodging. In addition, studies to limit internode elongation in rice have shown that PGRs can prevent exsertion of the panicle. Studies of this particular response to properly timed applications of PGRs have shown that seed production in red rice can be prevented. In that respect, PGRs offer the first control measure for established red rice in commercial rice production. Studies on enhancing panicle exsertion in white rice and preventing panicle exsertion in red rice were conducted.

Some PGRs are reported to increase grain yield directly. Several of those materials were evaluated.

To address the objectives of emergence and seedling vigor improvement of semidwarf cultivars, harvest efficiency, red rice seed elimination, and yield enhancement, PGRs were tested for their effects on rice growth and development.

SEEDLING VIGOR STUDIES

R.T. Dunand, R.R. Dilly, Jr., and G.A. Meche

Experiment:	Gibberellic Acid Seed Treatment and Seeding Rate in Semidwarf Rice (*Oryza sativa* 'LEMONT')
Location:	Rice Research Station, Crowley, LA (North Unit)
Variety:	Lemont
Seeding Rate:	See Treatment
Planting Date:	17 June 91
Row Spacing:	7-inch (2-inch planting depth, drill seeded)
Fertilizer:	7-21-21 with 1.2% zinc at 300 lb/A preplant incorporated, 5 June; Urea (46% N) at 200 lb/A (topdress), 15 July
Plot Size:	157.5 ft^2 - 5.25 (9 rows) x 30 ft
Treated Area:	157.5 ft^2 - 5.25 x 30 ft
Treatment(s):	Formulation (rates): Gibberellic Acid Release (1 oz/100 lb seed) Timing: Seed Treatment Seeding Rates: 25, 50, 75, and 100 lb/A
Sprayer:	N/A
Pertinent Rainfall:	18 June, .57 inches; 21 June, .5 inches; 24 June, .7 inches; 27 June, .64 inches; 1 July, .49 inches
Herbicide(s):	Stam M4 + Basagran (3 qt + 2 pt/A) by airplane, 2 July Stam M4 + Bolero 8EC (2 qt + 1 pt/A) by airplane, 15 July Ordram 15G (20 lb/A) by airplane, 18 July Londax (2 oz/A) by airplane, 25 July Bolero 10G (40 lb/A) by airplane, 31 July

<u>Insecticide(s):</u>	Furadan 3G (17 lb/A) by airplane, 31 July Sevin 4F (2 pt/A) by back-pack sprayer, 19 August and by airplane, 28 August
<u>Fungicide(s):</u>	Benlate 50 DF (1 lb/A) by airplane, 18, 19, and 25 July, 21 August, 6 and 18 September
<u>Emergence:</u>	21 June
<u>Permanent Flood:</u>	16 July
<u>Harvest Date:</u>	9 October
<u>Harvested Area:</u>	157.5 ft^2 - 5.25 x 30 ft
<u>Exp. Design:</u>	Factorial (2x4), randomized complete block (4 replications)

<u>Comments:</u> Stand was affected primarily by seeding rate, and rate of emergence was affected by Release (Table 1). With each incremental 25 lb/A increase in seeding rate, stand was proportionately higher during the period from 6 to 16 days after planting (DAP). The incremental increases were independent of Release seed treatment. Earlier emergence was noted with the Release seed treatment. In general, emergence was advanced by 1 day with Release. This trend was noted from 5 to 7 DAP. From 9 to 16 DAP, stands were the same whether seed were treated with Release or not. The effect was constant across seeding rates.

During early seedling development, plant height was increased by Release seed treatment (Table 2). At 10 DAP, seedlings from seed treated with Release were significantly taller by 2 cm. At this time, growth stage of seedlings was 1- to 2-leaf stage and height was primarily due to the length of the first leaf. Although not significant, seedling height was taller by 2 cm at 14 DAP due to seed treatment with Release. At this time, growth stage of seedlings was 2- to 3-leaf stage and height was primarily due to the length of the second leaf. After 14 DAP, there were relatively insignificant differences in plant height noted. At 16 and 22 DAP, plant height was primarily due to the length of the third and fourth leaves, respectively.

At maturity, grain yield was affected by seeding rate and Release (Table 3). Grain moisture was unaffected by either. Respective of rate of Release, grain yields were significantly higher with seeding rates above 25 lb/A. In the same regard, there were no differences between grain yields at seeding rates above 25 lb/A. Respective of seeding rate, grain yields were unaffected by Release. With Release and seeding rates above 25 lb/A, grain yields were significantly higher compared to the seeding rate of 25 lb/A with or without Release. Grain yields for untreated seed at all seeding rates and treated seed planted at 25 lb/A were not significantly different.

Table 1. The effect of seed treatment with Release (gibberellic acid) and seeding rate on stand of semidwarf rice (*Oryza sativa* 'LEMONT'). Rice Research Station, Crowley, LA. 1991.

Release rate (oz/cwt)	Seeding rate (lb/A)	Days after planting					
		5	6	7	9	11	16
		Stand (plants/sq ft)					
0	25	0c[1]	2f	5f	6d	6d	6e
	50	0c	4e	7f	10c	11c	10d
	75	0c	5e	11d	15b	16b	15c
	100	0c	10c	17b	21a	22a	20b
1	25	1bc	5e	6f	6d	6d	6e
	50	2b	8d	10e	11c	11c	11d
	75	3a	12b	15c	16b	17b	16c
	100	4a	16a	21a	23a	23a	22a

[1] Means in a column followed by the same letter are not significantly different (P=.05) using the Duncan's multiple range test.

Table 2. The effect of seed treatment with Release (gibberellic acid) and seeding rate on seedling height of semidwarf rice (*Oryza sativa* 'LEMONT'). Rice Research Station, Crowley, LA. 1991.

Release rate (oz/cwt)	Seeding rate (lb/A)	Days after planting 10	14	16	22	114
		Plant height[1] (cm)				
0	25	8.3b[2]	17.1c	21.2b	26b	108ab
	50	8.7b	17.7bc	21.5ab	28ab	108ab
	75	8.5b	17.2bc	21.3b	28ab	106bc
	100	8.3b	17.9bc	22.6ab	29a	106c
1	25	10.5a	19.0abc	21.9ab	28ab	109a
	50	11.0a	18.3bc	22.4ab	29a	108abc
	75	10.6a	19.1ab	22.9a	28ab	108ab
	100	10.9a	20.5a	23.0a	28ab	106bc

[1] Extended leaf height except for extended panicle height at maturity (114 days after planting).
[2] Means in a column followed by the same letter are not significantly different (P=.05) using the Duncan's multiple range test.

Table 3. The effect of seed treatment with Release (gibberellic acid) and seeding rate on grain production of semidwarf rice (*Oryza sativa* 'LEMONT'). Rice Research Station, Crowley, LA. 1991.

Release rate (oz/cwt)	Seeding rate (lb/A)	Grain Moisture (%)	Grain Yield[1] (lb/A)
0	25	20.6a[2]	4149c
	50	19.9a	4502ab
	75	19.8a	4510ab
	100	19.9a	4523ab
1	25	20.0a	4298bc
	50	19.5a	4575a
	75	20.1a	4602a
	100	19.5a	4605a

[1] Adjusted to 12% moisture.
[2] Means in a column followed by the same letter are not significantly different (P=.05) using the Duncan's multiple range test.

SEEDLING VIGOR STUDIES

R.T. Dunand, S.D. Linscombe, R.R. Dilly, Jr., and G.A. Meche

Experiment:	Gibberellic Acid Seed Treatment Rice Variety Screen
Location:	Rice Research Station, Crowley, LA (North Unit)
Variety:	See Treatment
Seeding Rate:	100 lb/A
Planting Date:	18 June 91
Row Spacing:	7-inch (2-inch planting depth, drill seeded)
Fertilizer:	7-21-21 with 1.2% zinc at 300 lb/A preplant incorporated 18 June; Urea (46% N) at 200 lb/A (topdress), 15 July
Plot Size:	8 or 9 rows (see Exp. Design) x 20 ft
Treated Area:	8 or 9 rows (see Exp. Design) x 20 ft
Treatment(s):	Formulation (rates):
	Gibberellic Acid
	Release (1 & 2 oz/100 lb seed)
	Timing: Seed Treatment

Variety/ Experimental Line:

AS3510	Lacassine	Rosemont
Alan	Lemont	Skybonnet
Bengal	L202	Tebonnet
Cypress	Mars	Texmont
Della	Maybelle	TX3069
Dellmont	Mercury	TX3072
Gui Chow	Millie	V4716
Gulfmont	Newbonnet	V7817
Jackson	Orion	LA2031
Jasmine 85	Rexmont	LA2146
Katy	RT7015	LA2215
Labelle	Rico 1	

Sprayer: N/A

Pertinent
Rainfall: 18 June, .57 inches; 21 June,.5 inches; 24 June, .7 inches; 27 June, .64 inches; 1 July, .49 inches

Herbicide(s): Stam M4 + Basagran (3 qt + 2 pt/A) by airplane, 2 July
Stam M4 + Bolero 8EC (2 qt + 1 pt/A) by airplane, 15 July
Ordram 15G (20 lb/A) by airplane, 18 July
Londax (2 oz/A) by airplane, 25 July
Bolero 10G (40 lb/A) by airplane, 31 July

Insecticide(s): Furadan 3G (17 lb/A) by airplane, 31 July
Sevin 4F (2 pt/A) by back-pack sprayer, 19 August and by airplane, 28 August

Fungicide(s): Benlate 50 DF (1 lb/A) by airplane, 18, 19, and 25 July, 21 August, 6 and 18 September

Emergence: 23 June

Permanent Flood: 16 July

Harvest Date: N/A

Harvested Area: N/A

Exp. Design: Randomized complete block (3 replications). A given plot contained a different variety or experimental line in each row. There were four such plots. Three contained 9 rows and one contained 8 rows in accommodating 35 varieties and experimental lines. The position of a variety or experimental line within a given plot was constant. Each given plot was planted in triplicate in each replicate. Of each triplicate, one plot had untreated seed and the other two plots had seed treated with different rates of Release according to the randomization of plots.

Comments: In general, the response to gibberellic acid seed treatment was minimal compared to past years. In part, seeding depth was approximately one inch less due to a wet subsoil from previous high rainfall. Also moderate, frequent rainfall from seeding through emergence compacted the soil making effective planting depth even less and preventing the soil surface from hardening.

Medium-grain and semidwarf long-grain varieties and experimental lines were more responsive with regard to stand improvement from gibberellic acid seed treatment than short and tall stature long-grain varieties and experimental lines. Four of eight medium-grain and nine of fifteen semidwarf long-grain varieties and experimental lines had significant increases in stand (Tables 1 and 2). The four medium-grain varieties and experimental lines were Gui Chow, V4716, Bengal, and TX3069. The nine semidwarf long-grain varieties and experimental lines were Dellmont, Gulfmont, Jasmine 85, Lacassine, Rexmont, Texmont, V7817, and TX3072. None of the short stature varieties responded to gibberellic acid seed treatment (Table 3) and Della was the only tall stature long-grain variety in which gibberellic acid seed treatment significantly increased stand (Table 4).

Seed treatment with gibberellic acid can, under some circumstances, carry over and affect elongation of seedlings. This occurred with low frequency in this study. Of the 35 varieties and experimental lines tested, seven had significant increases in seedling height due to gibberellic acid seed treatment. These varieties and experimental lines were the medium-grain TX3069 (Table 1), the semidwarf long-grains Rosemont and Cypress (Table 2), the short stature long-grains AS3510 and Jackson (Table 3), and the tall stature long-grains Della and Skybonnet (Table 4).

Increases in stand from gibberellic acid can result in increases in panicle density. The varieties and experimental lines with increases in stand due to gibberellic acid seed treatment, which also had significant increases in panicle density, were the semidwarf long-grains Gulfmont, Lacassine, Rexmont, V7817, and Cypress (Table 2) and the tall stature long-grain Labelle (Table 4). Although four medium-grain varieties and experimental lines had stand increases from gibberellic seed treatment, none of them had a significant increase in panicle density (Table 1). The four semidwarf long-grain varieties and experimental lines which had increases in stand but not panicle density were Dellmont, Jasmine 85, Texmont, and TX3072 (Table 2). The lone tall stature long-grain, Della, which had an increase in stand, had no increase in panicle density (Table 4). Two varieties which had no increase in stand but had an increase in panicle density due to gibberellic acid seed treatment were the short stature long-grain Alan (Table 3) and the tall stature long-grain Katy (Table 4).

Table 1. The effect of Release (gibberellic acid) seed treatment on varieties and experimental lines of medium-grain rice (*Oryza sativa* L.). Rice Research Station, Crowley, LA. 1991.

Variety/ Experimental Line	Release rate (oz/cwt)	Stand[1] (plants/sq ft)	Seedling height[2] (cm)	Panicle density (panicles/sq ft)
Bengal	0	15b[3]	17.7a	38a
	1	21a	22.2a	33a
	2	18ab	18.8a	36a
Gui Chow	0	22b	13.2a	38a
	1	28a	15.6a	39a
	2	28a	15.5a	33a
Mars	0	28a	21.0a	38a
	1	31a	23.4a	40a
	2	30a	22.6a	37a
Mercury	0	17a	17.3a	23a
	1	21a	17.9a	25a
	2	23a	18.3a	26a
Orion	0	22a	14.3a	64a
	1	30a	17.3a	68a
	2	28a	15.7a	69a
Rico 1	0	29a	14.5a	56a
	1	34a	16.1a	59a
	2	34a	17.4a	59a
V4716	0	22b	16.9a	59a
	1	35a	16.8a	63a
	2	39a	20.8a	69a
TX3069	0	11b	13.1b	35a
	1	23a	14.7ab	32a
	2	19ab	16.8a	35a

[1] Seven days after planting.
[2] Twenty-two days after planting, 2- to 3-leaf stage.
[3] Means for a given variety/experimental line in a column followed by the same letter are not significantly different (P=.05) using the Duncan's multiple range test.

Table 2. The effect of Release (gibberellic acid) seed treatment on varieties and experimental lines of semidwarf long-grain rice (*Oryza sativa* L.). Rice Research Station, Crowley, LA. 1991.

Variety/ Experimental Line	Release rate (oz/cwt)	Stand[1] (plants/sq ft)	Seedling height[2] (cm)	Panicle density (panicles/sq ft)
Cypress	0	26b[3]	14.5b	42b
	1	31a	19.1a	48a
	2	32a	16.1b	45ab
Dellmont	0	22b	15.5a	39a
	1	30a	16.3a	39a
	2	25ab	15.8a	38a
Gulfmont	0	15b	14.6a	30b
	1	26a	15.6a	36a
	2	25a	15.9a	34ab
Jasmine 85	0	17b	13.8a	32a
	1	24a	15.2a	39a
	2	21ab	16.5a	34a
Lacassine	0	17b	14.5a	54b
	1	24a	15.2a	57ab
	2	27a	16.0a	60a
Lemont	0	17a	15.6a	35a
	1	21a	16.1a	37a
	2	21a	15.1a	37a
L202	0	30a	16.2a	43a
	1	30a	18.0a	41a
	2	27a	18.8a	41a
Rexmont	0	4b	12.3a	35b
	1	22a	14.8a	50ab
	2	22a	14.7a	52a
RT7015	0	25a	15.4ab	46a
	1	28a	18.8a	42a
	2	24a	13.7b	42a
Rosemont	0	21a	12.8b	26a
	1	24a	18.4a	28ab
	2	27a	19.6a	30b

Continued.

Table 2. Continued.

Variety/ Experimental Line	Release rate (oz/cwt)	Stand[1] (plants/sq ft)	Seedling height[2] (cm)	Panicle density (panicles/sq ft)
Texmont	0	17b	15.2a	46a
	1	18b	16.0a	54a
	2	24a	17.1a	50a
V7817	0	15b	11.8a	53b
	1	28a	14.5a	71a
	2	31a	13.7a	71a
LA2031	0	22a	16.7a	47a
	1	25a	22.1a	44a
	2	24a	17.6a	44a
LA2215	0	17a	13.1a	30a
	1	21a	14.3a	37a
	2	23a	14.6a	39a
TX3072	0	15b	14.7a	40a
	1	24a	17.9a	40a
	2	24a	16.1a	37a

[1] Seven days after planting.
[2] Twenty-two days after planting, 2- to 3-leaf stage.
[3] Means for a given variety/selection in a column followed by the same letter are not significantly different (P=.05) using the Duncan's multiple range test.

Table 3. The effect of Release (gibberellic acid) seed treatment on varieties of short stature long-grain rice (Oryza sativa L.). Rice Research Station, Crowley, LA. 1991.

Variety/ Experimental Line	Release rate (oz/cwt)	Stand[1] (plants/sq ft)	Seedling height[2] (cm)	Panicle density (panicles/sq ft)
AS3510	0	20a[3]	16.7b	83a
	1	26a	18.1ab	77a
	2	25a	19.4a	83a
Alan	0	32a	18.8a	62b
	1	28a	18.3a	73a
	2	31a	19.3a	66ab
Jackson	0	27a	16.6b	41a
	1	27a	18.3b	35b
	2	26a	21.3a	40a
Maybelle	0	30a	15.8a	35a
	1	29a	16.9a	33a
	2	28a	19.1a	38a
Millie	0	24a	16.8a	39a
	1	24a	18.3a	35a
	2	23a	19.4a	40a

[1] Seven days after planting.
[2] Twenty-two days after planting, 2- to 3-leaf stage.
[3] Means for a given variety/experimental line in a column followed by the same letter are not significantly different (P=.05) using the Duncan's multiple range test.

Table 4. The effect of Release (gibberellic acid) seed treatment on varieties and experimental lines of tall stature long-grain rice (*Oryza sativa* L.). Rice Research Station, Crowley, LA. 1991.

Variety/ Experimental Line	Release rate (oz/cwt)	Stand[1] (plants/sq ft)	Seedling height[2] (cm)	Panicle density (panicles/sq ft)
Della	0	22b[3]	17.2b	42a
	1	30a	19.5a	36a
	2	25ab	19.0ab	35a
Katy	0	25a	15.4a	38b
	1	29a	16.0a	47a
	2	29a	17.1a	41a
Labelle	0	33ab	15.9a	61b
	1	32b	13.8a	62b
	2	37a	16.3a	71a
Newbonnet	0	25a	16.5a	37a
	1	29a	17.1a	35a
	2	26a	15.6a	37a
Skybonnet	0	28a	16.0b	44a
	1	26a	16.9b	42a
	2	29a	19.6a	44a
Tebonnet	0	25a	17.4a	27a
	1	28a	18.4a	25a
	2	24a	19.3a	25a
LA2146	0	40a	16.1a	42a
	1	44a	18.0a	43a
	2	41a	18.8a	44a

[1] Seven days after planting.
[2] Twenty-two days after planting, 2- to 3-leaf stage.
[3] Means for a given variety/experimental line in a column followed by the same letter are not significantly different (P=.05) using the Duncan's multiple range test.

SEEDLING VIGOR STUDIES

R.T. Dunand, J.B. Baker, R.R. Dilly, Jr., and G.A. Meche

Experiment:	Foliar Gibberellic Acid and Postemergence Herbicide Compatibility in Semidwarf Rice (Oryza sativa 'LEMONT')
Location:	Rice Research Station, Crowley, LA (South Unit)
Variety:	Lemont
Seeding Rate:	75 lb/A
Planting Date:	10 April 91
Row Spacing:	7-inch
Fertilizer:	7-21-21 with 1.2% zinc at 300 lbs/A drilled at planting 10 April); Urea (46% N) at 200 lb/A by airplane (20 May)
Plot Size:	273.6 ft^2 - 7.6 (13 rows) x 36 ft
Treated Area:	273.6 ft^2 - 7.6 x 36 ft
Treatment(s):	Formulation (rate):

Gibberellic Acid

RyzUp (1 oz/A)

Herbicides

Arrosolo 3-3E (1 gal/A)
Basagran (1.5 pt/A)
Bolero (3 pt/A)
Facet (.75 lb/A)*
Londax (1 oz/A)*
Propanil 4 (1 gal/A)
Prowl (1.5 pt/A)
Stam 80 EDF (5 lb/A)*
Stam M4 (1 gal/A)
Riverside Propanil 60 DF (6.67 lb/A)
Wham DF (8 lb/A)*

Herbicides (continued)

Wham EZ (1 gal/A)
Wham EZ/Activity Booster Premixture (2 and 3 qt/A)
Wham EZ/Facet Premixture (3 and 4 qt/A)
Wham Up (3 and 4 qt/A)
Whip (1.2 pt/A)

* Crop Oil (Clean Crop) added at 1 qt/A.

Timing: 2- to 3-leaf stage, 1 May

Sprayer: CO_2-driven, hand-held, 32 psi, 15 GPA, 80015 nozzles

Pertinent Rainfall: No significant rainfall within 24 hours following applications.

Insecticide(s): Furadan (17 lb/A) by airplane, 31 May

Fungicide(s): Tilt (10 oz/A) by airplane, 2 July; Benlate (1 lb/A) by airplane, 15 July

Emergence: 16 April

Permanent Flood: 21 May

Harvest Date: 14 August

Harvested Area: 273.6 ft^2 - 7.6 x 36 ft

Exp. Design: Randomized complete block (4 replications)

Comments: Seedling Height. Seedling height following applications of RyzUp and post emergence herbicides was monitored between 5 and 20 days after treatment (DAT). Major differences in plant height were observed during that period.

With the exception of Whip, RyzUp alone and in combination with a crop oil or a herbicide increased seedling height significantly at 5, 9, 15, and 20 DAT (Table 1). Increases ranged from as little as 3 cm to as much as 17 cm. There was little difference in RyzUp alone (unweedy) or in combination with crop oil (unweedy) or herbicides which require the addition of crop oils. Differences ranged between 1 and 4 cm during the observation period. These small differences were significant at 9 and 15 DAT for Facet, Londax, and Stam 80 EDF but not for Wham DF. The greatest and most consistent increase in seedling height was noted with the herbicides which do not require additives. Of these herbicides, Arrosolo, Stam M4+Basagran, and Wham EZ+Basagran caused Ryzup to significantly increase seedling height over RyzUp + Crop Oil (unweedy) on each of the four observation times. RyzUp caused a significant increase in seedling height at all observation times except 5 DAT when mixed with Propanil 4, Stam M4, Wham EZ, Stam M4 + Bolero, Stam M4 + Londax, or Stam M4 + Prowl. Whip alone or in mixture with RyzUp significantly decreased seedling height at each of the observation times. Decreases ranged from 2 to 11 cm, depending on date of observation. The herbicide premixes had no effect on seedling height.

Tolerance and control ratings. Weed control and rice injury were evaluated by visual ratings using the following scales:

Rice tolerance:

1 - very severe injury with greater than 90% stand reduction.
2 - severe injury with 70-90% stand reduction.
3 - moderate injury, primarily leaf burning and/or stunting.
4 - slight injury, primarily leaf burning.
5 - no detectable injury

Weed control:

1 - poor control, less than 10%.
2 - slight control, 10-30%.
3 - moderate control, 30-70%
4 - good control, 70-90%.
5 - excellent control, 90-100%.

Rice tolerance. Herbicidal activity was evaluated at 7, 16, and 99 DAT. Rice had good to excellent tolerance (ratings of 4 and 5, respectively) to most of the treatments (Table 2). At 7 DAT, rice had fair tolerance (3 rating) to Whip. Seedlings were stunted and leaves were wilting. Ryzup had a significant negative effect on tolerance to Facet and Whip. At 7 DAT, rice had fair tolerance to Facet + Ryzup and poor tolerance (2 rating) to Whip + Ryzup. Facet + RyzUp caused abnormal growth. Seedlings were twisted and bent along the soil surface. Some leaf curling was noted. Whip + RyzUp caused more severe symptoms than Whip alone. By 16 DAT, rice tolerance to Facet + RyzUp had increased to fair and tolerance to Whip remained essentially the same. At maturity, rice tolerance to Facet + RyzUp had increased to excellent and tolerance to Whip and Whip + RyzUp had increased to moderate and good, respectively.

Weed control. Weeds were separated into two categories. Junglerice (Echinochola colonum), sprangletop (Leptochloa panicoides), and broadleaf signalgrass (Bracharia platyphylla) were the primary grass species of weed. The other predominant weed species were rice flatsedge (Cyperus iria) and yellow nutsedge (Cyperus esculentus). Grasses were rated as a composite during the seedling stage evaluations and separately at maturity. The flood controlled broadleaf signalgrass which was absent at maturity. The sedges were rated separately. Rice flatsedge was mature and decomposing below the rice canopy and was not rated at maturity. In general, there was better control of the grass species than the sedges.

Grass control. Grass control ratings taken 8, 14, and 99 DAT showed most treatments gave good to excellent control (Table 3). The main exception was Londax. Initially, grass control with Londax was fair. At 14 DAT, grass control increased to good except for Londax+RyzUp which decreased to poor. At maturity, junglerice and sprangletop control was good. Facet had poor sprangletop control at maturity. The addition of RyzUp increased control of sprangletop to excellent.

Sedge control. Rice flatsedge control ratings taken 8 and 14 DAT showed most treatments gave good to excellent control (Table 4). The exception was Whip. Control with Whip was moderate. RyzUp had no effect on sedge control.

Yellow nutsedge control was mostly good to excellent at 7 and 99 DAT compared to mostly moderate to poor at 16 DAT (Table 5). Facet gave no control at 7 and 16 DAT and moderate control at 99 DAT. Londax gave no to moderate control at 7 and 16 DAT and excellent control at 99 DAT. Whip gave no control to poor control consistently. Wham/Activity Booster gave moderate control at 99 DAT. Stam M4+Basagran gave good to excellent control consistently. RyzUp improved control with Arrosolo at 16 DAT and with Stam M4 at 99 DAT. RyzUp decreased control with Londax, Wham DF, and Stam M4+Londax at 7 DAT.

Mature plant height. With the exception of Whip, mature plant height was unaffected by RyzUp and herbicides (Table 6). Plant heights ranged from 92 to 97 cm. With Whip, plant height was 87 to 88 cm.

Grain moisture. With the exception of Whip, grain moisture was relatively constant, ranging from 18.7 to 20.0% (Table 6). Grain moisture was significantly higher with Whip alone than with any other herbicide. Grain moisture with Whip alone was 21.3%.

Grain yield. With the exception of the weedy checks and Whip, grain yields ranged between 5761 and 6820 lb/A (Table 6). A majority of the herbicide treatments had yields above 6000 lb/A. Yields were somewhat lower for Londax+RyzUp, Facet, Stam M4+Prowl+RyzUp, and the low rate of Wham/Activity Booster. Grain yields for the weedy checks and Whip treatments ranged between 3400 and 4900 lb/A. RyzUp significantly increased grain yield for Whip. Grain yield for Whip alone was 3487 lb/A compared with 4464 lb/A for Whip+RyzUp.

Differences in grain yield were mostly related to degree of weed control. Londax+RyzUp had low weed control ratings during early season. Facet had low sprangletop control. Stam M4+Prowl+RyzUp had low yellow nutsedge control during early season, and the low rate of Wham/Activity Booster had low yellow nutsedge control at maturity. Yellow nutsedge control was lower for Whip alone compared to Whip+RyzUp.

Table 1. The effect of postemergence herbicides and RyzUp (gibberellic acid) on seedling growth of semidwarf rice (*Oryza sativa* 'LEMONT'). Rice Research Station. Crowley, LA. 1991.

Treatment	Rate (Amt/A)	Days After Application 5	9	15	20
		-------Plant Height (cm)--------			
A. Controls					
Weedy Check		26fg[1]	28ijk	33d	34lm
Weedy Check + RyzUp[2]		31cd	36fg	39bc	39f-j
Weedy Check[3] + RyzUp		32bcd	38cde	39bc	40d-h
Unweedy Check[4]		25ghi	26k	30d	35j-m
Unweedy Check + RyzUp		28ef	33h	37c	38g-k
Unweedy Check[3] + RyzUp		30de	35g	38c	40e-i
B. Postemergence Herbicides and RyzUp					
Arrosolo	1 gal	25ghi	27ijk	30d	34lm
Arrosolo + RyzUp	1 gal	35a	41abc	44a	46ab
Facet[3]	.75 lb	26fg	30i	33d	35j-m
Facet[3] + RyzUp	.75 lb	33a-d	38cde	42ab	42b-g
Londax4	1 oz	25ghi	28ijk	31d	33m
Londax4 + RyzUp	1 oz	32a-d	38def	42ab	42b-g
Propanil 4	1 gal	23ij	27jk	31d	35j-m
Propanil 4 + RyzUp	1 gal	32bcd	41ab	44a	45abc
Propanil 60 DF	6.67 lb	24ghi	27ijk	30d	34lm
Propanil 60 DF + RyzUp	6.67 lb	31bcd	40bcd	42ab	41c-g
Stam M4	1 gal	25ghi	28ijk	31d	34lm
Stam M4 + RyzUp	1 gal	32bcd	40a-d	43a	45ab
Stam 80 EDF[3]	5 lb	25ghi	28ijk	31d	34lm
Stam 80 EDF[3] + RyzUp	5 lb	31cd	38cde	42ab	42b-g
Wham DF[3]	8 lb	25ghi	27ijk	32d	36i-m
Wham DF[3] + RyzUp	8 lb	32bcd	36efg	39c	40d-h
Wham EZ	1 gal	25ghi	28ijk	32d	36i-m
Wham EZ + RyzUp	1 gal	32bcd	38cde	43a	44a-d
Whip	1.2 pt	21j	21l	22e	28n
Whip + RyzUp	1.2 pt	23ij	22l	24e	27n

Continued.

Table 1. Continued.

Treatment	Rate (Amt/A)	Days After Application 5	9	15	20
		-------Plant Height (cm)--------			
C. Propanil + Other Herbicides and RyzUp					
Stam M4 + Basagran	3 qt+1.5 pt	23hij	27ijk	32d	36i-m
Stam M4 + Basagran+RyzUp	3 qt+1.5 pt	33abc	43a	44a	46a
Stam M4 + Bolero	3 qt + 3 pt	24ghi	28ijk	32d	35j-m
Stam M4 + Bolero + RyzUp	3 qt + 3 pt	32bcd	39bcd	42ab	43a-e
Stam M4 + Londax	3 qt + 1 oz	26fgh	28ijk	32d	35j-m
Stam M4 + Londax + RyzUp	3 qt + 1 oz	32bcd	40bcd	43a	44a-d
Stam M4 + Prowl	3 qt+1.5 pt	25ghi	27ijk	30d	35klm
Stam M4 + Prowl + RyzUp	3 qt+1.5 pt	32bcd	40bcd	42ab	45abc
Wham EZ + Basagran	3 qt+1.5 pt	25ghi	29ijk	31d	34lm
Wham EZ+Basagran+RyzUp	3 qt+1.5 pt	34ab	40bcd	43a	42a-f
D. Propanil Premixtures					
Wham/Activity Booster	2 qt	26gh	28ijk	31d	34lm
Wham/Activity Booster	3 qt	24ghi	28ijk	32d	35klm
Wham/Facet	3 qt	25ghi	27ijk	32d	36i-m
Wham/Facet	4 qt	25ghi	29ijk	32d	37h-l
Wham Up	3 qt	26fg	29ij	33d	35klm
Wham Up	4 qt	24ghi	27ijk	32d	35j-m

[1] Means in a column followed by the same letter are not significantly different (P=.05) using the Duncan's multiple range test.
[2] Rate = 1 oz/A.
[3] Crop oil (1 qt Clean Crop/A) added according to labeled instructions.
[4] Initial treatment followed 1 day later with Arrosolo (1 gal/A).

Table 2. The effect of postemergence herbicides and RyzUp (gibberellic acid) on seedling growth of semidwarf rice (Oryza sativa 'LEMONT'). Rice Research Station. Crowley, LA. 1991.

Treatment	Rate (Amt/A)	Days After Application 7	16	99
		-Rice Tolerance Rating[1]-		
A. Controls				
Weedy Check		5a[2]	5a	5a
Weedy Check + RyzUp[3]		5a	5a	5a
Weedy Check[4] + RyzUp		5a	5a	5a
Unweedy Check[5]		4cd	5a	5a
Unweedy Check + RyzUp		4cd	5a	5a
Unweedy Check[4] + RyzUp		4de	5a	5a
B. Postemergence Herbicides and RyzUp				
Arrosolo	1 gal	5ab	5a	5a
Arrosolo + RyzUp	1 gal	5ab	5a	5a
Facet[4]	.75 lb	5a	5a	5a
Facet[4] + RyzUp	.75 lb	3e	4c	5a
Londax[4]	1 oz	5a	5a	5a
Londax[4] + RyzUp	1 oz	5ab	5a	5a
Propanil 4	1 gal	4bcd	5a	5a
Propanil 4 + RyzUp	1 gal	5abc	5a	5a
Propanil 60 DF	6.67 lb	5ab	5a	5a
Propanil 60 DF + RyzUp	6.67 lb	5ab	5a	5a
Stam M4	1 gal	5abc	5a	5a
Stam M4 + RyzUp	1 gal	4bcd	5a	5a
Stam 80 EDF[4]	5 lb	5a	5a	5a
Stam 80 EDF[4] + RyzUp	5 lb	5a	5a	5a
Wham DF[4]	8 lb	5abc	5a	5a
Wham DF[4] + RyzUp	8 lb	5ab	5a	5a
Wham EZ	1 gal	5a	5a	5a
Wham EZ + RyzUp	1 gal	5a	5a	5a
Whip	1.2 pt	3f	2d	3c
Whip + RyzUp	1.2 pt	2f	2e	4b

Continued.

Table 2. Continued.

Treatment	Rate (Amt/A)	Days After Application 7	16	99
		-Rice Tolerance Rating[1]-		
C. Propanil + Other Herbicides and RyzUp				
Stam M4 + Basagran	3 qt + 1.5 pt	5ab	5a	5a
Stam M4 + Basagran+RyzUp	3 qt + 1.5 pt	5a	5a	5a
Stam M4 + Bolero	3 qt + 3 pt	4cd	5a	5a
Stam M4 + Bolero + RyzUp	3 qt + 3 pt	4cd	5a	5a
Stam M4 + Londax	3 qt + 1 oz	5ab	5a	5a
Stam M4 + Londax + RyzUp	3 qt + 1 oz	5ab	5a	5a
Stam M4 + Prowl	3 qt + 1.5 pt	4bcd	5a	5a
Stam M4 + Prowl + RyzUp	3 qt + 1.5 pt	5abc	5a	5a
Wham EZ + Basagran	3 qt + 1.5 pt	5a	5a	5a
Wham EZ + Basagran+RyzUp	3 qt + 1.5 pt	5a	5a	5a
D. Propanil Premixtures				
Wham/Activity Booster	2 qt	5a	5b	5a
Wham/Activity Booster	3 qt	5a	5a	5a
Wham/Facet	3 qt	5a	5a	5a
Wham/Facet	4 qt	5abc	5a	5a
Wham Up	3 qt	5a	5a	5a
Wham Up	4 qt	5a	5a	5a

[1] See text.
[2] Means in a column followed by the same letter are not significantly different (P=.05) using the Duncan's multiple range test.
[3] Rate = 1 oz/A
[4] Crop oil (1 qt Clean Crop/A) added according to labeled instructions.
[5] Initial treatment followed 1 day later with Arrosolo (1 gal/A).

Table 3. The effect of postemergence herbicides and RyzUp (gibberellic acid) on control of grassy weeds in semidwarf rice (*Oryza sativa* 'LEMONT'). Rice Research Station. Crowley, LA. 1991.

		Grass Species[1]			
		GRASS	GRASS	ECHCO	LEFPA
	Rate	Days After Application			
Treatment	(Amt/A)	7	16	99	99
		------Weed Control Ratings[2]-----			
A. Controls					
Weedy Check		1g[3]	1de	1d	1e
Weedy Check + RyzUp[4]		1f	2d	1d	1e
Weedy Check[5] + RyzUp		1g	1e	1d	1e
Unweedy Check[6]		4bcd	4abc	5a	5a
Unweedy Check + RyzUp		5abc	5abc	5a	5a
Unweedy Check[5] + RyzUp		5a	4abc	5a	5a
B. Postemergence Herbicides and RyzUp					
Arrosolo	1 gal	5a	4abc	5a	5a
Arrosolo + RyzUp	1 gal	5ab	5ab	5a	5a
Facet[5]	.75 lb	4bcd	5a	5a	3d
Facet[5] + RyzUp	.75 lb	5ab	5a	5a	5a
Londax[5]	1 oz	3ef	4c	4bc	4bc
Londax[5] + RyzUp	1 oz	3f	2d	4c	4bc
Propanil 4	1 gal	5a	4abc	5a	5a
Propanil 4 + RyzUp	1 gal	5ab	4abc	5a	5a
Propanil 60 DF	6.67 lb	5ab	5abc	5a	5a
Propanil 60 DF + RyzUp	6.67 lb	5a	5ab	5a	5a
Stam M4	1 gal	5ab	4abc	5a	5a
Stam M4 + RyzUp	1 gal	5a	4abc	5a	5a
Stam 80 EDF[5]	5 lb	5ab	4abc	5a	5a
Stam 80 EDF[5] + RyzUp	5 lb	5ab	4abc	5a	5a
Wham DF[5]	8 lb	5a	5abc	5a	5a
Wham DF[5] + RyzUp	8 lb	5abc	4bc	5a	5a
Wham EZ	1 gal	5ab	4bc	5a	5a
Wham EZ + RyzUp	1 gal	5ab	4abc	5a	5a
Whip	1.2 pt	5abc	4abc	5a	5a
Whip + RyzUp	1.2 pt	5ab	5ab	5a	5a

Continued.

Table 3. Continued.

Treatment	Rate (Amt/A)	GRASS 7	GRASS 16	ECHCO 99	LEFPA 99
		Grass Species[1] / Days After Application			
		------Weed Control Ratings[2]-----			
C. Propanil + Other Herbicides and RyzUp					
Stam M4 + Basagran	3 qt+1.5 pt	4bcd	4abc	5a	5a
Stam M4+Basagran+RyzUp	3 qt+1.5 pt	5ab	5abc	5a	5a
Stam M4 + Bolero	3 qt + 3 pt	5a	5abc	5a	5a
Stam M4 + Bolero + RyzUp	3 qt + 3 pt	5a	5a	5a	5ab
Stam M4 + Londax	3 qt + 1 oz	5a	4abc	5a	5a
Stam M4 + Londax + RyzUp	3 qt + 1 oz	4cd	4abc	5a	5a
Stam M4 + Prowl	3 qt+1.5 pt	5abc	4abc	5a	5a
Stam M4 + Prowl + RyzUp	3 qt+1.5 pt	5abc	4abc	5a	5a
Wham EZ + Basagran	3 qt+1.5 pt	5a	4abc	5a	5a
Wham EZ+Basagran+RyzUp	3 qt+1.5 pt	5a	5abc	5a	5a
D. Propanil Premixtures					
Wham/Activity Booster	2 qt	5abc	4bc	4b	5ab
Wham/Activity Booster	3 qt	4de	4abc	5a	5a
Wham/Facet	3 qt	5a	5a	5a	5ab
Wham/Facet	4 qt	5a	5a	5a	5a
Wham Up	3 qt	4bcd	4abc	5a	5a
Wham Up	4 qt	5ab	5abc	5a	5a

[1] GRASS = a mixture of grassy weed species but mainly ECHCO (*Echinochloa colona*, junglerice), LEFPA (*Leptichloa panicoides*, amazon sprangletop) and BRAPP (*Brachiaria platyphylla*, broadleaf signalgrass).
[2] See text.
[3] Means in a column followed by the same letter are not significantly different (P=.05) using the Duncan's multiple range test.
[4] Rate = 1 oz/A
[5] Crop oil (1 qt Clean Crop/A) added according to labeled instructions.
[6] Initial treatment followed 1 day later with Arrosolo (1 gal/A).

Table 4. The effect of postemergence herbicides and RyzUp (gibberellic acid) on control of CYPIR (*Cyperus iria*, rice flatsedge) in semidwarf rice (*Oryza sativa* 'LEMONT'). Rice Research Station, Crowley, LA. 1991.

Treatment	Rate (Amt/A)	Days After Application 7	Days After Application 16
		-Weed Control Ratings[1]-	
A. Controls			
Weedy Check		1h[2]	1g
Weedy Check + RyzUp[3]		1h	2f
Weedy Check[4] + RyzUp		1h	1g
Unweedy Check[5]		5a	5ab
Unweedy Check + RyzUp		5a	5a
Unweedy Check[4] + RyzUp		5a	5abc
B. Postemergence Herbicides and RyzUp			
Arrosolo	1 gal	5a	4a-d
Arrosolo + RyzUp	1 gal	5ab	5a
Facet[4]	.75 lb	3g	4a-d
Facet[4] + RyzUp	.75 lb	4def	4cd
Londax[4]	1 oz	4efg	4a-d
Londax[4] + RyzUp	1 oz	3g	4a-d
Propanil 4	1 gal	5a	5abc
Propanil 4 + RyzUp	1 gal	5a	5abc
Propanil 60 DF	6.67 lb	5a	4a-d
Propanil 60 DF + RyzUp	6.67 lb	5abc	5a
Stam M4	1 gal	5a	4bcd
Stam M4 + RyzUp	1 gal	5a	5abc
Stam 80 EDF[4]	5 lb	5a	4a-d
Stam 80 EDF[4] + RyzUp	5 lb	5ab	4a-d
Wham DF[4]	8 lb	5a	5abc
Wham DF[4] + RyzUp	8 lb	5a	4a-d
Wham EZ	1 gal	5ab	4a-d
Wham EZ + RyzUp	1 gal	5a	5abc
Whip	1.2 pt	3fg	3e
Whip + RyzUp	1.2 pt	3g	3e

Continued.

Table 4. Continued.

Treatment	Rate (Amt/A)	Days After Application 7	16
		-Weed Control Ratings[1]-	
C. Propanil + Other Herbicides and RyzUp			
Stam M4 + Basagran	3 qt + 1.5 pt	5a	5a
Stam M4+Basagran+RyzUp	3 qt + 1.5 pt	5a	5a
Stam M4 + Bolero	3 qt + 3 pt	5a	5a
Stam M4 + Bolero + RyzUp	3 qt + 3 pt	5a	5a
Stam M4 + Londax	3 qt + 1 oz	5a	5ab
Stam M4 + Londax + RyzUp	3 qt + 1 oz	5ab	4a-d
Stam M4 + Prowl	3 qt + 1.5 pt	5ab	5abc
Stam M4 + Prowl + RyzUp	3 qt + 1.5 pt	5abc	5ab
Wham EZ + Basagran	3 qt + 1.5 pt	5a	5ab
Wham EZ+Basagran+RyzUp	3 qt + 1.5 pt	5a	5a
D. Propanil Premixtures			
Wham/Activity Booster	2 qt	4efg	4bcd
Wham/Activity Booster	3 qt	4cde	4de
Wham/Facet	3 qt	5a	5ab
Wham/Facet	4 qt	5a	5a
Wham Up	3 qt	4bcd	4cde
Wham Up	4 qt	5a	5ab

[1] See text.
[2] Means in a column followed by the same letter are not significantly different (P=.05) using the Duncan's multiple range test.
[3] Rate = 1 oz/A.
[4] Crop oil (1 qt Clean Crop/A) added according to labeled instructions.
[5] Initial treatment followed 1 day later with Arrosolo (1 gal/A).

Table 5. The effect of postemergence herbicides and RyzUp (gibberellic acid) on control of CYPES (Cyperus esculentus, yellow nutsedge) in semidwarf rice (Oryza sativa 'LEMONT'). Rice Research Station, Crowley, LA. 1991.

Treatment	Rate (Amt/A)	Days After Application 7	16	99
		-Weed Control Ratings[1]-		
A. Controls				
Weedy Check		1h[2]	1g	1g
Weedy Check + RyzUp[3]		1h	1fg	1g
Weedy Check[4] + RyzUp		1h	1g	1g
Unweedy Check[5]		5abc	4ab	5ab
Unweedy Check + RyzUp		5abc	4ab	5ab
Unweedy Check[4] + RyzUp		5abc	3a-f	5ab
B. Postemergence Herbicides and RyzUp				
Arrosolo	1 gal	5abc	2b-g	5ab
Arrosolo + RyzUp	1 gal	5abc	4a	5a
Facet[4]	.75 lb	1gh	1fg	3cd
Facet[4] + RyzUp	.75 lb	2gh	2d-g	4bc
Londax[4]	1 oz	3ef	3abc	5a
Londax[4] + RyzUp	1 oz	1gh	3a-f	5a
Propanil 4	1 gal	4cd	3a-e	4bc
Propanil 4 + RyzUp	1 gal	5abc	2c-g	5ab
Propanil 60 DF	6.67 lb	4a-d	3a-e	5a
Propanil 60 DF + RyzUp	6.67 lb	4bcd	3a-e	5ab
Stam M4	1 gal	4dec	2c-g	3cd
Stam M4 + RyzUp	1 gal	4bcd	3a-f	5ab
Stam 80 EDF[4]	5 lb	4bcd	3a-f	5ab
Stam 80 EDF[4] + RyzUp	5 lb	4a-d	2d-g	4abc
Wham DF[4]	8 lb	5abc	3a-f	4abc
Wham DF[4] + RyzUp	8 lb	4de	2d-g	4ab
Wham EZ	1 gal	4bcd	2d-g	4ab
Wham EZ + RyzUp	1 gal	4bcd	2b-g	4abc
Whip	1.2 pt	1gh	2c-g	1fg
Whip + RyzUp	1.2 pt	2fg	2c-g	2ef

Continued.

Table 5. Continued.

Treatment	Rate (Amt/A)	Days After Application 7	16	99
		-Weed Control Ratings[1]-		
C. Propanil + Other Herbicides and RyzUp				
Stam M4 + Basagran	3 qt + 1.5 pt	5abc	3a-d	5ab
Stam M4+Basagran+RyzUp	3 qt + 1.5 pt	5abc	4ab	5a
Stam M4 + Bolero	3 qt + 3 pt	5abc	3a-f	5ab
Stam M4 + Bolero + RyzUp	3 qt + 3 pt	4bcd	3a-e	4abc
Stam M4 + Londax	3 qt + 1 oz	5a	4a	5a
Stam M4 + Londax + RyzUp	3 qt + 1 oz	4bcd	4ab	5a
Stam M4 + Prowl	3 qt + 1.5 pt	4cd	3a-e	4abc
Stam M4 + Prowl + RyzUp	3 qt + 1.5 pt	4de	2efg	4ab
Wham EZ + Basagran	3 qt + 1.5 pt	5abc	3a-f	5ab
Wham EZ+Basagran+RyzUp	3 qt + 1.5 pt	5ab	3a-d	5a
D. Propanil Premixtures				
Wham/Activity Booster	2 qt	4de	5b	3de
Wham/Activity Booster	3 qt	4cd	5a	4abc
Wham/Facet	3 qt	5abc	5a	4abc
Wham/Facet	4 qt	5ab	5a	5a
Wham Up	3 qt	4cd	5a	4bc
Wham Up	4 qt	5ab	5a	5ab

[1] See text.
[2] Means in a column followed by the same letter are not significantly different (P=.05) using the Duncan's multiple range test.
[3] Rate = 1 oz/A.
[4] Crop oil (1 qt Clean Crop/A) added according to labeled instructions.
[5] Initial treatment followed 1 day later with Arrosolo (1 gal/A).

Table 6. The effect of postemergence herbicides and RyzUp (gibberellic acid) on mature plant development in semidwarf rice (Oryza sativa 'LEMONT'). Rice Research Station. Crowley, LA. 1991.

Treatment	Rate (Amt/A)	Plant Height (cm)	Grain Moisture (%)	Grain Yield[1] (lb/A)
A. Controls				
Weedy Check		93abc[2]	20.0bcd	3876gh
Weedy Check + RyzUp[3]		92c	19.6b-e	4836f
Weedy Check[4] + RyzUp		95abc	19.5b-e	3989gh
Unweedy Check[5]		94abc	19.1cde	6442a-e
Unweedy Check + RyzUp		95abc	19.8b-e	6404a-e
Unweedy Check[4] + RyzUp		94abc	19.4b-e	6374a-e
B. Postemergence Herbicides and RyzUp				
Arrosolo	1 gal	96abc	19.5b-e	6588a-e
Arrosolo + RyzUp	1 gal	96ab	18.9cde	6688abc
Facet[4]	.75 lb	96ab	20.0bc	5938b
Facet[4] + RyzUp	.75 lb	95abc	19.3b-e	6214a-e
Londax[4]	1 oz	93abc	19.0cde	6329a-e
Londax[4] + RyzUp	1 oz	96ab	19.1cde	5875cde
Propanil 4	1 gal	96ab	19.5b-e	6544a-e
Propanil 4 + RyzUp	1 gal	94abc	19.1cde	6554a-e
Propanil 60 DF	6.67 lb	93abc	18.7de	6511a-e
Propanil 60 DF + RyzUp	6.67 lb	96abc	18.7de	6610a-d
Stam M4	1 gal	95abc	19.6b-e	6419a-e
Stam M4 + RyzUp	1 gal	96ab	19.7b-e	6550a-e
Stam 80 EDF[4]	5 lb	94abc	19.4b-e	6534a-e
Stam 80 EDF[4] + RyzUp	5 lb	96ab	19.1cde	6468a-e
Wham DF[4]	8 lb	97a	19.3cde	6820a
Wham DF[4] + RyzUp	8 lb	94abc	19.3cde	6340a-e
Wham EZ	1 gal	97a	19.5b-e	6626a-d
Wham EZ + RyzUp	1 gal	94abc	19.0cde	6658abc
Whip	1.2 pt	87d	21.3a	3487h
Whip + RyzUp	1.2 pt	88d	20.6ab	4464fg

Continued.

Table 6. Continued.

Treatment	Rate (Amt/A)	Plant Height (cm)	Grain Moisture (%)	Grain Yield[1] (lb/A)
C. Propanil + Other Herbicides and RyzUp				
Stam M4 + Basagran	3 qt+1.5 pt	95abc	19.3b-e	6823a
Stam M4+Basagran+RyzUp	3 qt+1.5 pt	95abc	19.0cde	6602a-e
Stam M4 + Bolero	3 qt + 3 pt	94abc	19.1cde	6542a-e
Stam M4 + Bolero + RyzUp	3 qt + 3 pt	95abc	19.3cde	6629a-e
Stam M4 + Londax	3 qt + 1 oz	94abc	19.1cde	6962a
Stam M4 + Londax + RyzUp	3 qt + 1 oz	93abc	18.9cde	6411a-e
Stam M4 + Prowl	3 qt+1.5 pt	92bc	19.0cde	6289a-e
Stam M4 + Prowl + RyzUp	3 qt+1.5 pt	95abc	19.1cde	5761e
Wham EZ + Basagran	3 qt+1.5 pt	94abc	19.2cde	6644abc
Wham EZ+Basagran+RyzUp	3 qt+1.5 pt	95abc	19.3b-e	6756ab
D. Propanil Premixtures				
Wham/Activity Booster	2 qt	94abc	19.5b-e	5811de
Wham/Activity Booster	3 qt	94abc	18.7e	6353a-e
Wham/Facet	3 qt	96ab	19.5b-e	6292a-e
Wham/Facet	4 qt	95abc	19.1cde	6631a-d
Wham Up	3 qt	94abc	19.4b-e	6273a-e
Wham Up	4 qt	95abc	19.5b-e	6707ab

[1] Adjusted to 12% moisture.
[2] Means in a column followed by the same letter are not significantly different (P=.05) using the Duncan's multiple range test.
[3] Rate = 1 oz/A.
[4] Crop oil (1 qt Clean Crop/A) added according to labeled instructions.
[5] Initial treatment followed 1 day later with Arrosolo (1 gal/A).

SEEDLING VIGOR STUDIES

R.T. Dunand, R.R. Dilly, Jr., and G.A. Meche

Experiment: Foliar Gibberellic Acid, Adjuvant Rate, and Postemergence Herbicide Comparisons in Semidwarf Rice (*Oryza sativa* 'LEMONT')

Location: Rice Research Station, Crowley, LA (South Unit)

Variety: Lemont

Seeding Rate: 75 lb/A

Planting Date: 10 April 91

Row Spacing: 7-inch

Fertilizer: 7-21-21 with 1.2% zinc at 300 lb/A drilled at planting, 10 April; Urea (46% N) at 200 lb/A by airplane, 20 May

Plot Size: 273.6 ft^2 - 7.6 (13 rows) x 36 ft

Treated Area: 273.6 ft^2 - 7.6 x 36 ft

Treatment(s): Formulation (rates):

Gibberellic Acid

RyzUp (.5 and 1 oz/A)

Adjuvants

Agridex (1 qt/A)
AG98 (1 qt/A)
Clean Crop (.5 and 1 qt/A)
Penetrator Plus (1 qt/A)

Herbicides

Bolero (3 pt/A)
Stam M4 (3 qt/A)
Wham EZ (3 qt/A)

Timing: 2- to 3-leaf stage, 2 May

Sprayer: CO_2-driven, hand-held, 32 psi, 15 GPA, 80015 nozzles

Pertinent Rainfall: No significant rainfall within 24 hours following applications.

Herbicide(s): All plots not receiving herbicide as a part of the experiment were oversprayed with Stam M4+Bolero 8EC (3 qt + 2 pt), 2 May

Insecticide(s): Furadan (17 lb/A) by airplane, 31 May

Fungicide(s): Tilt (10 oz/A) by airplane, 2 July
Benlate (1 lb/A) by airplane, 15 July

Emergence: 16 April

Permanent Flood: 21 May

Harvest Date: 8 August

Harvested Area: 273.6 ft^2 - 7.6 x 36 ft

Exp. Design: Randomized complete block (4 replications)

Comments: RyzUp and mixtures with RyzUp increased seedling height during the period from 4 to 19 days after treatment (DAT) (Table 1). RyzUp alone or in mixture with a herbicide or adjuvant at the rate of 1 qt/A consistently resulted in significantly taller seedlings. RyzUp (.5 oz/A) + crop oil (1 qt/A) and RyzUp (1 oz/A) produced essentially equivalent responses. The only exception was at 8 DAT when the low rate of RyzUp and crop oil resulted in significantly taller seedlings than the high rate of RyzUp alone. Rates of crop oil less than 1 qt/A did not give consistent increases in seedling height.

Responses to RyzUp and mixtures with RyzUp during the evaluation period varied (Table 1). Responses to RyzUp alone and in mixture with Penetrator Plus and Wham EZ + Agridex were relatively constant during the 15-day evaluation period and ranged from 3 to 6 cm. Responses to RyzUp in mixture with Agridex, Clean Crop, and Stam M4+Bolero increased from a low of 4 to 5 cm at 4 DAT to a high of 6 to 9 cm after 4 DAT. Increases in seedling height were greatest with AG98 and Stam M4. At 4 DAT, seedling height was increased 5 to 6 cm, and afterwards, seedling height was increased by 10 to 12 cm depending on chemical and time after application.

Mature plant development was relatively unaffected by seedling applications of RyzUp, adjuvants, and herbicides (Table 2). Mature plant height ranged from 94 to 96 cm. Grain moisture ranged between 21.0 and 21.8%. Grain yield ranged between 5945 and 6165 lb/A.

Table 1. The effect of rate of RyzUp (gibberellic acid) and adjuvants and herbicides on seedling growth of semidwarf rice (*Oryza sativa* 'LEMONT'). Rice Research Station, Crowley, LA. 1991.

Chemical	Rate (Amt/A)	Days After Application 4	8	15	19
		--------Seedling Height[1] (cm)--------			
A. Control					
Check	-	24g[2]	27i	32e	33f
RyzUp	1 oz	27b-f	31fg	36cd	38cde
B. RyzUp (1 oz/A) + Adjuvants and Herbicides					
Agridex	1 qt	29ab	34bcd	41ab	39cd
AG98	1 qt	30a	39a	43a	43ab
Penetrator Plus	1 qt	27b-f	32d-g	38bc	38cde
Stam M4	1 gal	29abc	37ab	43a	44a
Stam M4 + Bolero	3 qt + 3 pt	29a-d	36bc	40ab	41bc
Wham EZ + Agridex	3 qt + 1 qt	27b-e	33c-f	38bc	37cde
C. RyzUp and Crop Oil Rate					
RyzUp + Clean Crop	.5 oz + 0 qt	27c-f	30ghi	35cde	37def
RyzUp + Clean Crop	.5 oz + .25 qt	26d-g	31fg	35cde	36def
RyzUp + Clean Crop	.5 oz + .5 qt	26efg	30gh	35cde	35def
RyzUp + Clean Crop	.5 oz + 1 qt	28a-d	34cde	37bc	38cd
RyzUp + Clean Crop	1 oz + 0 qt	27b-e	32efg	37bc	37def
RyzUp + Clean Crop	1 oz + .25 qt	25fg	30ghi	35cde	34f
RyzUp + Clean Crop	1 oz + .5 qt	27c-f	31fg	35cde	36def
RyzUp + Clean Crop	1 oz + 1 qt	28a-d	34bc	40ab	39cd

[1] Extended leaf length.
[2] Means in a column followed by the same letter are not significantly different (P=.05) using the Duncan's multiple range test.

Table 2. The effect of rate of RyzUp (gibberellic acid) and adjuvants and herbicides on mature plant development and grain yield of semidwarf rice (*Oryza sativa* 'LEMONT'). Rice Research Station, Crowley, LA. 1991.

Chemical	Rate (Amt/A)	Plant Height (cm)	Grain Yield[1] (lb/A)	Grain Moisture (%)
A. Control				
Check	-	95abc[2]	6010a	21.8a
RyzUp	1 oz	95abc	6102a	21.0a
B. RyzUp (1 oz/A) + Adjuvants and Herbicides				
Agridex	1 qt	94bc	6075a	21.4a
AG98	1 qt	95abc	6029a	21.5a
Penetrator Plus	1 qt	94c	6165a	21.1a
Stam M4	1 gal	95abc	5995a	21.5a
Stam M4 + Bolero	3 qt + 3 pt	95abc	6030a	21.3a
Wham EZ + Agridex	3 qt + 1 qt	96ab	6068a	21.3a
C. RyzUp and Crop Oil Rate				
RyzUp + Clean Crop	.5 oz + 0 qt	95abc	6114a	21.3a
RyzUp + Clean Crop	.5 oz + .25 qt	95abc	6073a	21.0a
RyzUp + Clean Crop	.5 oz + .5 qt	95abc	6007a	21.8a
RyzUp + Clean Crop	.5 oz + 1 qt	96a	6054a	21.4a
RyzUp + Clean Crop	1 oz + 0 qt	95abc	5945a	21.2a
RyzUp + Clean Crop	1 oz + .25 qt	94bc	5979a	21.4a
RyzUp + Clean Crop	1 oz + .5 qt	95abc	6162a	21.3a
RyzUp + Clean Crop	1 oz + 1 qt	95abc	6037a	21.2a

[1] Adjusted to 12% moisture.
[2] Means in a column followed by the same letter are not significantly different (P=.05) using the Duncan's multiple range test.

SEEDLING VIGOR STUDIES

R.T. Dunand, S.D. Linscombe, R.R. Dilly, Jr. and G.A. Meche

Experiment:	Foliar Gibberellic Acid Variety Screen
Location:	Rice Research Station, Crowley, LA (North Unit)
Variety:	See Treatment
Seeding Rate:	100 lb/A
Planting Date:	18 June 91
Row Spacing:	7-inch (1-inch planting depth)
Fertilizer:	7-21-21 with 1.2% zinc at 300 lb/A preplant incorporated 18 June; Urea (46% N) at 200 lb/A (topdress), 15 July
Plot Size:	11 or 12 rows (see Exp. Design) x 20 ft
Treated Area:	11 or 12 rows (see Exp. Design) x 20 ft
Treatment(s):	Formulation (rates):
	Gibberellic Acid
	Ryzup (1 & 2 oz/A)
	Timing: 2-leaf stage, 1 July

Variety/ Experimental Line:

AS3510	Lacassine	Rosemont
Alan	Lemont	Skybonnet
Bengal	L202	Tebonnet
Cypress	Mars	Texmont
Della	Maybelle	TX3069
Dellmont	Mercury	TX3072
Gui Chow	Millie	V4716
Gulfmont	Newbonnet	V7817
Jackson	Orion	LA2031
Jasmine 85	Rexmont	LA2146
Katy	RT7015	LA2215
Labelle	Rico 1	

Sprayer: CO_2-driven, hand-held, 32 psi, 15 GPA, 80015 nozzles

Pertinent Rainfall: 1 July, .49 inches two hours after application

Herbicide(s): Stam M4 + Basagran (3 qt + 2 pt/A) by airplane, 2 July
Stam M4 + Bolero 8EC (2 qt + 1 pt/A) by airplane, 15 July
Ordram 15G (20 lb/A) by airplane, 18 July
Londax (2 oz/A) by airplane, 25 July
Bolero 10G (40 lb/A) by airplane, 31 July

Insecticide(s): Furadan 3G (17 lb/A) by airplane, 31 July
Sevin 4F (2 pt/A) by back pack, 19 August and by airplane, 28 August

Fungicide(s): Benlate 50 DF (1 lb/A) by airplane, 18, 19, and 25 July, 21 August, 6 and 18 September

Emergence: 23 June

Permanent Flood: 16 July

Harvest Date: N/A

Harvested Area: N/A

Exp. Design: Randomized complete block (3 replications). A given plot contained a different variety or experimental line in each row. There were three such plots. Two contained 12 rows and one contained 11 rows in accommodating 35 varieties and experimental lines. The position of a variety or experimental line within a given plot was constant. Each given plot was planted in triplicate in each replicate. Of each triplicate, one plot was untreated and the other two plots were treated with different rates of RyzUp according to the randomization of plots.

Comments: Approximately 70% (23 of 35) of the varieties and experimental lines tested responded to the foliar application of gibberellic acid. The most responsive group was the semidwarf long-grain. Of this group, 80% (12 of 15) had a significant increase in seedling height following application of RyzUp (Table 1). The next most responsive group was the tall stature long-grain. Of this group, 70% (5 of 7) had a significant increase (Table 2). The third most responsive group was the medium-grain. Of this group, 50% (4 of 8) had a significant increase (Table 3). The least responsive group was the short stature long-grain. Of this group, 40% (2 of 5) had a significant increase (Table 4).

The higher rate of RyzUp produced the most consistent significant increase in seedling height. Of the 23 varieties and experimental lines responding to gibberellic acid, 11 were responsive at the rate of 1 oz/A, and all were responsive at the rate of 2 oz/A. The percentages of varieties and experimental lines in the semidwarf long-grain, tall stature long-grain, medium-grain, and short stature long-grain groups responding to the lower rate of RyzUp were 40, 45, 12, and 20%, respectively (Tables 1-4).

The effect of the rainfall which occurred 2 hours after application on a number of responsive varieties and experimental lines and on rate responsiveness of individual varieties and experimental lines is unknown.

Table 1. The effect of RyzUp (gibberellic acid) on varieties and experimental lines of semidwarf long-grain rice (*Oryza sativa* L.). Rice Research Station, Crowley, LA. 1991.

Variety/ Experimental line	RyzUp rate (oz/A)	Seedling height[1] (cm)
Cypress	0	31a[2]
	1	32a
	2	33a
Dellmont	0	29b
	1	33a
	2	35a
Gulfmont	0	28b
	1	33a
	2	34a
Jasmine 85	0	26b
	1	30ab
	2	33a
Lacassine	0	24b
	1	30a
	2	32a
Lemont	0	25b
	1	31ab
	2	33a
L202	0	28a
	1	32a
	2	35a
Rexmont	0	22b
	1	24a
	2	26a

Continued.

Table 1. Continued.

Variety/ Experimental line	RyzUp rate (oz/A)	Seedling height[1] (cm)
RT7015	0	33a
	1	31a
	2	33a
Rosemont	0	26b
	1	29ab
	2	29a
Texmont	0	28b
	1	29ab
	2	32a
V7817	0	25b
	1	26b
	2	29a
LA2031	0	33b
	1	35ab
	2	37a
LA2215	0	26b
	1	29b
	2	34a
TX3072	0	26b
	1	29b
	2	33a

[1] Seven days after application.
[2] Means for a given variety or experimental line in a column followed by the same letter are not significantly different (P=.05) using the Duncan's multiple range test.

Table 2. The effect of RyzUp (gibberellic acid) on varieties and experimental lines of tall stature long-grain rice (*Oryza sativa* L.). Rice Research Station. Crowley, LA. 1991.

Variety/ Experimental line	RyzUp rate (oz/A)	Seedling height[1] (cm)
Della	0	33b[2]
	1	38a
	2	38a
Katy	0	29b
	1	33a
	2	34a
Labelle	0	31b
	1	35a
	2	37a
Newbonnet	0	31b
	1	32b
	2	35a
Skybonnet	0	32a
	1	34a
	2	35a
Tebonnet	0	33a
	1	36a
	2	35a
LA2146	0	30b
	1	31ab
	2	33a

[1] Seven days after application.

[2] Means for a given variety or experimental line in a column followed by the same letter are not significantly different (P=.05) using the Duncan's multiple range test.

Table 3. The effect of RyzUp (gibberellic acid) on varieties and experimental lines of medium-grain rice (*Oryza sativa* L.). Rice Research Station, Crowley, LA. 1991.

Variety/ Experimental line	RyzUp rate (oz/A)	Seedling height[1] (cm)
Bengal	0	36b[2]
	1	37b
	2	39a
Gui Chow	0	26b
	1	29a
	2	32a
Mars	0	39a
	1	39a
	2	41a
Mercury	0	30a
	1	30a
	2	32a
Orion	0	31a
	1	32a
	2	33a
Rico 1	0	29a
	1	30a
	2	31a
TX3069	0	28b
	1	28b
	2	31a
V4716	0	32b
	1	33b
	2	35a

[1] Seven days after application.
[2] Means for a given variety or experimental line in a column followed by the same letter are not significantly different (P=.05) using the Duncan's multiple range test.

Table 4. The effect of RyzUp (gibberellic acid) on varieties of short stature long-grain rice (*Oryza sativa* L.). Rice Research Station, Crowley, LA. 1991.

Variety/ Experimental line	RyzUp rate (oz/A)	Seedling height[1] (cm)
AS3510	0	30b[2]
	1	32b
	2	36a
Alan	0	35a
	1	37a
	2	36a
Jackson	0	31b
	1	35a
	2	35a
Maybelle	0	33a
	1	33a
	2	35a
Millie	0	32a
	1	33a
	2	35a

[1] Seven days after application.
[2] Means for a given variety in a column followed by the same letter are not significantly different (P=.05) using the Duncan's multiple range test.

SEEDLING VIGOR STUDIES

R.T. Dunand, R.R. Dilly, Jr., and G.A. Meche

Experiment:	Foliar Gibberellic Acid and Quinclorac in Rice (*Oryza sativa* L.)
Location:	Rice Research Station, Crowley, LA (North Unit)
Variety:	See treatments
Seeding Rate:	100 lb/A
Planting Date:	20 June 91
Row Spacing:	7-inch (1-inch planting depth)
Fertilizer:	7-21-21 with 1.2% Zn at 300 lb/A preplant incorporated, 20 June; Urea (46% N) topdress at 200 lb/A, 15 July
Plot Size:	228 ft^2 - 7.6 (13 rows) x 30 ft
Treated Area:	228 ft^2 - 7.6 (13 rows) x 30 ft
Treatment(s):	Variety(s): Lemont Mars Maybelle Formulation(s) (rate): Gibberellic Acid RyzUp (1 oz/A) Quinclorac Facet 50 DF (.75 lb/A) Timing: 2- to 3-leaf stage (1 July, Maybelle and Mars; 3 July, Lemont); 3- to 4-leaf stage (8 July)
Pertinent Rainfall:	1 July, .5 inches approximately 1 hour after 2- to 3- leaf application; 3 July, 1.3 inches approximately 4 hours after 3- to 4- leaf application

Herbicide(s): Stam M4 + Basagran (3 qt + 2 pt/A) by airplane, 2 July
Stam M4 + Bolero 8EC (2 qt + 1 pt/A) by airplane, 15 July
Ordram 15G (20 lb/A) by airplane, 18 July
Londax (2 oz/A) by airplane, 25 July
Bolero 10G (40 lb/A) by airplane, 31 July

Insecticide(s): Furadan 3G (17 lb/A) by airplane, 31 July
Sevin 4F (2 pt/A) by airplane, 28 August

Fungicide(s): Benlate 50 DF (1 lb/A) by airplane, 18, 19, and 25 July; 21 August; 6 and 18 September

Emergence: 25 June

Permanent Flood: 16 July

Harvest Date: 7 October

Harvested Area: 228 ft^2 - 7.6 (13 rows) x 30 ft

Exp. Design: Split plot with a factorial (2x2) arrangement of the subplots (main plots=variety, subplots=time of application and chemical), randomized complete block (4 replicates)

Comments: Seedling height was influenced by variety, chemical, and time of chemical application (Table 1). At 7 days after treatment (DAT), Mars seedlings were generally tallest and Lemont seedlings shortest. Seedlings of Maybelle were intermediate. Also, the older seedlings (3- to 4-leaf stage) at time of application were taller 7 DAT than the younger seedlings. Maybelle and Mars were unresponsive to RyzUp applied at the 2- to 3-leaf stage. This was due to rain shortly after application. The response of Lemont to RyzUp applied at the 2- to 3-leaf stage was an increase of 7 cm in seedling height at 7 DAT. These seedlings of Lemont were similar in height to untreated Maybelle. All varieties were responsive to RyzUp applied at the 3- to 4-leaf stage. Increases in seedling height were 7, 13, and 12 cm for Maybelle, Mars, and Lemont, respectively. The increase in seedling height in Maybelle and Lemont produced seedlings equivalent in height to untreated Mars. Facet significantly decreased the response of Mars and Lemont to RyzUp applied at the 3- to 4-leaf stage. The decreases were 8 and 5 cm, respectively.

Seedling heights at 14 DAT showed the effects of variety, chemical, and time of chemical application had differences, as well as similarities compared to the effects noted at 7 DAT (Table 1). One difference was Facet, on average, reduced seedling height 1 cm. Some similarities were younger seedlings at application (2- to 3-leaf stage) were shorter than older seedlings at application (3- to 4-leaf stage) and varietal effects were similar also. In general, Mars was tallest, Lemont was shortest, and Maybelle was intermediate. The major exception was the older seedlings at application had similar heights for Mars and Maybelle. Seedling height was increased 8 cm on average by RyzUp when applied at the

3- to 4-leaf stage. The effect of RyzUp applied at the 2- to 3-leaf stage on seedling height was no longer detected at 14 DAT.

At maturity, plant height was influenced by variety only (Table 1). Mars was tallest, Maybelle was shortest, and Lemont was intermediate. Facet and RyzUp and time of application had no significant effect.

At harvest, lodging, grain moisture, and grain yield were affected differently by variety, chemical, and time of application (Table 2). Lodging occurred in Mars only and was unaffected by Facet, RyzUp, or time of application. Grain moisture was influenced by all factors except Facet. In general, grain moisture was associated with maturity. Maybelle had earliest maturity, Mars had latest maturity, and Lemont was slightly earlier maturing than Mars. An exception was RyzUp applied at the 3- to 4-leaf stage caused maturity in Lemont to be similar to the maturity of Mars with the exception of Mars at the 3- to 4-leaf stage which was not treated with RyzUp. Grain yield varied with variety and was increased significantly by RyzUp. Maybelle had the highest grain yield, Mars had the lowest grain yield, and grain yield of Lemont was slightly higher than Mars. RyzUp, on average, increased grain yield by 185 lb/A.

Table 1. The effect of RyzUp (gibberellic acid) and Facet (triclopyr) and time of application on height of rice (*Oryza sativa* L.). Rice Research Station, Crowley, LA. 1991.

Variety	Timing	RyzUp (oz/A)	Facet (lb/A)	Days after treatment 7	14	99
				----plant height[1](cm)----		
Maybelle	2-31	0	0	33j[2]	45	104
		0	.75	34ij	46	106
		1	0	35ij	48	103
		1	.75	34ij	43	103
	3-41	0	0	47f	56	103
		0	.75	46f	54	104
		1	0	54bcd	65	104
		1	.75	55bc	62	104
Mars	2-31	0	0	41g	52	124
		0	.75	41g	51	125
		1	0	42g	51	125
		1	.75	40gh	52	124
	3-41	0	0	51de	57	125
		0	.75	49ef	55	127
		1	0	64a	65	124
		1	.75	56b	64	125

Continued.

Table 1. Continued.

Variety	Timing	RyzUp (oz/A)	Facet (lb/A)	Days after treatment 7	14	99
				----plant height[1](cm)----		
Lemont	2-31	0	0	30k	40	108
		0	.75	29k	40	108
		1	0	37hi	41	111
		1	.75	35ij	42	110
	3-41	0	0	40gh	51	111
		0	.75	41g	50	110
		1	0	52cde	58	111
		1	.75	47f	56	111
Variety						
Maybelle						104c
Mars						125a
Lemont						110b
Facet						
			0		52a	
			.75		51b	
Variety x Time						
Maybelle	2-31				45c	
	3-41				60a	
Mars	2-31				52b	
	3-41				60a	
Lemont	2-31				41d	
	3-41				54b	
Time x RyzUp						
	2-31	0			46c	
		1			46c	
	3-41	0			54b	
		1			62a	

[1] Extended leaf length.
[2] Means in the same column followed by the same letter are not significantly different (P=.05) using the Duncan's multiple range test.

Table 2. The effect of RyzUp (gibberellic acid) and Facet (triclopyr) and time of application on mature plant development of rice (*Oryza sativa* L.). Rice Research Station, Crowley, LA. 1991.

Variety	Timing	RyzUp (oz/A)	Facet (lb/A)	Lodging (%)	Grain Moisture (%)	Grain Yield[1] (lb/A)
Maybelle	2-31	0	0	0	12.4	5034
		0	.75	0	12.4	4940
		1	0	0	12.4	5112
		1	.75	0	12.6	5292
	3-41	0	0	0	12.9	4821
		0	.75	0	13.2	4640
		1	0	0	12.8	5256
		1	.75	0	12.8	5401
Mars	2-31	0	0	60	23.8	2871
		0	.75	70	23.6	2842
		1	0	40	23.9	3042
		1	.75	70	24.7	2624
	3-41	0	0	60	24.7	2600
		0	.75	40	24.9	3025
		1	0	60	23.8	2638
		1	.75	60	24.3	3098
Lemont	2-31	0	0	0	22.3	2861
		0	.75	0	22.6	2966
		1	0	0	22.3	3202
		1	.75	0	21.8	3243
	3-41	0	0	0	22.0	3083
		0	.75	0	22.3	2877
		1	0	0	22.3	2992
		1	.75	0	23.3	3244
Variety						
Maybelle				0b[2]		5062a
Mars				60a		2842c
Lemont				0b		3058b
RyzUp						
		0				3547b
		1				3762a

Continued.

Table 2. Continued.

Variety	Timing	RyzUp (oz/A)	Facet (lb/A)	Lodging (%)	Grain Moisture (%)	Grain Yield[1] (lb/A)
Variety x Time x RyzUp						
Maybelle	2-31	0			12.4d	
		1			12.5d	
	3-41	0			13.0d	
		1			12.8d	
Mars	2-31	0			23.7ab	
		1			24.3ab	
	3-41	0			24.8a	
		1			24.0ab	
Lemont	2-31	0			22.4c	
		1			22.1c	
	3-41	0			22.2c	
		1			22.8bc	

[1] Adjusted to 12% moisture.
[2] Means in the same column followed by the same letter are not significantly different (P=.05) using the Duncan's multiple range test.

SEEDLING VIGOR STUDIES

R.T. Dunand, R.R. Dilly, Jr., and G.A. Meche

Experiment: Foliar Gibberellic Acid, Adjuvants, Triclopyr, and Zinc in Semidwarf Rice (*Oryza sativa* 'LEMONT')

Location: Rice Research Station, Crowley, LA (North Unit)

Variety: Lemont

Seeding Rate: 100 lb/A

Planting Date: 20 June 91

Row Spacing: 7-inch (1-inch planting depth)

Fertilizer: 7-21-21 with 1.2% Zn at 300 lb/A preplant incorporated, 20 June; Urea (46%N) topdress at 200 lb/A, 15 July

Plot Size: 42 ft^2 - 3.5 (6 rows) x 12 ft

Treated Area: 42 ft^2 - 3.5 x 12 ft

Treatment(s): Formulation(s) (rate):

Gibberellic Acid

RyzUp (1 oz/A)

Adjuvants

Agridex (1 qt/A)
AG98 (1 qt/A)
Activate Plus (1 qt/A)
American Spreader (1 qt/A)
Clean Crop (1 qt/A)
CS7 (1 qt/A)
NuFilm (1 qt/A)
Penetrator Plus (1 qt/A)
Plex (1 qt/A)
Prime Oil (1 qt/A)
Tween 20 (1 qt/A)
Valent X77 (1 qt/A)

Triclopyr

Rely (1 pt/A)

Zinc

Frit Crop-Lex (5.2 lb/A)

Timing: 2- to 3-leaf stage, 2 July

Pertinent Rainfall: No significant rainfall within 24 hours after applications

Herbicide(s): Stam M4 + Basagran (3 qt + 2 pt/A) by airplane, 2 July
Stam M4 + Bolero 8EC (2 qt + 1 pt/A) by airplane, 15 July
Ordram 15G (20 lb/A) by airplane, 18 July
Londax (2 oz/A) by airplane, 25 July
Bolero 10G (40 lb/A) by airplane, 31 July

Insecticide(s): Furadan 3G (17 lb/A) by airplane, 31 July
Sevin 4F (2 pt/A) by airplane, 28 August

Fungicide(s): Benlate 50 DF(1 lb/A) by airplane, 18, 19, and 25 July, 21 August, 6 and 18 September

Emergence: 26 June

Permanent Flood: 16 July

Harvest Date: 8 October

Harvested Area: 42 ft^2 - 3.5 x 12 ft

Exp. Design: Randomized complete block (4 replicates)

Comments: Seedling height was affected differently by RyzUp and RyzUp in mixture with adjuvants, Rely, and Frit Crop-Lex (Table 1). RyzUp alone did not significantly increase seedling height. When mixed with crop oil concentrates and surfactants, RyzUp was effective in increasing seedling height. The most consistent increases in seedling height were obtained with Activate Plus, Tween 20, Unifilm, and Valent X77. At 6 days after treatment (DAT), RyzUp + Tween 20 increased seedling height by 12 cm compared to the control. Increases with Activate Plus, Unifilm, and Valent 77 were 8 to 9 cm. At 13 DAT, increases above the control were 15 cm for Tween 20 and 5 to 7 cm for Activate Plus, Unifilm, and Valent 77. Rely significantly decreased seedling height and in mixuture with RyzUp had no significant effect on seedling height. Mixing the Frit Crop-Lex formulation of zinc with RyzUp had no significant effect on seedling height. Increases in seedling height where noted were due to increases in the lengths of the third, fourth, and fifth leaves of the seedling. The effectiveness of Activate Plus, Tween 20, Unifilm, and Valent X77 was probably due to the ability of these compounds to facilitate entry of gibberellic acid into the seedling or adherence of gibberellic acid to the leaves.

At harvest, plant height, grain moisture, and grain yield were mostly unaffected by gibberellic acid and adjuvants (Table 2). Plant height ranged between 106 and 109 cm and grain moisture ranged between 20.9 and 22.2%. There was no difference in grain yield between adjuvants. Grain yields ranged between 5118 and 5426 lb/A. RyzUp in mixture with Frit Crop-Lex also had little effect on mature plant height and grain moisture and yield. Rely significantly reduced grain yield. Grain yield for Rely + RyzUp was not significantly different from Rely alone, nor was it significantly different from the control.

Table 1. The effect of RyzUp (gibberellic acid), adjuvants, Rely (triclopyr), and Frit Crop-Lex (zinc) on seedling development of semidwarf rice (*Oryza sativa* 'LEMONT'). Rice Research Station, Crowley, LA. 1991.

Chemical	Rate (Amt./A)	Days after treatment 6	Days after treatment 13	Leaf number[1] 3	Leaf number[1] 4	Leaf number[1] 5
		--------Length(cm)--------				
Control	-	32ef[2]	39ef	22def	33e-h	37fg
RyzUp	1 oz	36cde	39ef	20f	32fgh	37d-g
RyzUp (1 oz/A) + Adjuvants						
Activate Plus	1 qt	41b	45bc	28ab	41bc	43bc
Agridex	1 qt	35de	40def	23c-f	34d-h	40c-g
American Spreader	1 qt	38bcd	42b-f	24c-f	37b-f	42bcd
AG98	1 qt	38bcd	41c-f	25a-e	38b-e	41b-g
Clean Crop	1 qt	39bcd	43b-e	25a-e	38b-e	42bc
CS7	1 qt	37cde	40c-f	25a-e	37b-f	40b-f
NuFilm	1 qt	40bc	42b-f	26a-d	40bcd	42b-f
Penetrator Plus	1 qt	35de	41c-f	23c-f	37c-f	41b-f
Plex	1 qt	36cde	40c-f	24b-e	37c-f	39c-g
Prime Oil	1 qt	37cde	41c-f	24cde	36c-f	40b-g
Tween 20	1 qt	48a	54a	28a	49a	52a
Unifilm	1 qt	40bc	44bcd	26abc	43b	42b-e
Valent X77	1 qt	40bc	46b	24b-e	39bcd	45b
Rely						
Rely	1 pt	25g	38f	21ef	29h	36g
Rely + RyzUp	1 pt + 1 oz	29fg	39ef	21ef	29fh	37efg
Frit Crop-Lex						
Frit Crop-Lex + RyzUp	5.2 lb + 1 oz	37cde	41c-f	22c-f	35d-g	41b-f

[1] 13 days after treatment.
[2] Means within the same column followed by the same letter are not significantly (P=.05) different using the Duncan's multiple range test.

Table 2. The effect of RyzUp (gibberellic acid), adjuvants, Rely (triclopyr), and Frit Crop-Lex (zinc) on mature plant development of semidwarf rice (*Oryza sativa* 'LEMONT'). Rice Research Station, Crowley, LA. 1991.

Chemical	Rate (Amt./A)	Plant Height (cm)	Grain Moisture (%)	Grain Yield[1] (lb/A)
Control	-	109ab[2]	22.1a	5311ab
RyzUp	1 oz	106c	20.9a	5341ab
RyzUp (1 oz/A) + Adjuvants				
Activate Plus	1 qt	108abc	21.0a	5426ab
Agridex	1 qt	107abc	21.0a	5281abc
American Spreader	1 qt	108abc	22.4a	5364ab
AG98	1 qt	108abc	22.1a	5299ab
Clean Crop	1 qt	108abc	22.2a	5330ab
CS7	1 qt	108abc	21.4a	5171bc
NuFilm	1 qt	108abc	21.0a	5178abc
Penetrator Plus	1 qt	108abc	21.3a	5360ab
Plex	1 qt	107abc	21.9a	5216abc
Prime Oil	1 qt	107abc	21.0a	5393ab
Tween 20	1 qt	107bc	21.3a	5212abc
Unifilm	1 qt	108abc	22.1a	5118bc
Valent X77	1 qt	108abc	21.4a	5265abc
Rely				
Rely	1 pt	108abc	21.4a	4893c
Rely + RyzUp	1 pt + 1 oz	109a	21.1a	5266abc
Frit Crop-Lex				
Frit Crop-Lex + RyzUp	5.2 lb + 1 oz	109ab	21.2a	5579a

[1] Adjusted to 12% moisture.
[2] Means within the same column followed by the same letter are not significantly (P=.05) different using the Duncan's multiple range test.

HARVEST EFFICIENCY STUDY

R.T. Dunand, R.R. Dilly, Jr., and G.A. Meche

Experiment:	Foliar Gibberellic Acid and Harvest Efficiency in Semidwarf Rice (*Oryza sativa* 'LEMONT')
Location:	Rice Research Station, Crowley, LA (South Unit)
Variety:	Lemont
Seeding Rate:	75 lb/A
Planting Date:	10 April 91
Row Spacing:	7-inch (1-inch planting depth)
Fertilizer:	Main Crop 7-21-21 with 1.2% zinc at 300 lb/A drilled at planting, 10 April; Urea (46% N) at 200 lb/A by airplane, 20 May Ratoon Crop Urea (46% N) at 100 lb/A by hand, 21 August
Plot Size:	212.8 ft^2 - 7.6 (13 rows) x 28 ft
Treated Area:	212.8 ft^2 - 7.6 x 28 ft
Treatment(s):	Formulation (rates): Gibberellic Acid RyzUp (2 and 4 oz/A) Timing: Late Boot, 3 July
Sprayer:	CO_2-driven, hand-held, 32 psi, 15 GPA, 80015 nozzles
Pertinent Rainfall:	No significant rainfall within 6 hours after treatment
Herbicide(s):	Stam M4+Bolero 8EC (3 qt + 2 pt), 2 May

Insecticide(s): Furadan (17 lb/A) by airplane, 31 May

Fungicide(s): Tilt (10 oz/A) by airplane, 2 July
Benlate (1 lb/A) by airplane, 15 July

Emergence: 16 April

Permanent Flood: 21 May (main crop); 21 August (ratoon crop)

Harvest Date: 14 August (main crop); 14 November (ratoon crop)

Harvested Area: 212.8 ft^2 - 7.6 x 28 ft

Exp. Design: Randomized complete block (4 replications)

Comments: Main Crop -- The application of RyzUp during late boot significantly increased elongation of the main culm and the second and third internodes below the panicle (Table 1). Stem elongation was affected by rate of RyzUp and unaffected by the addition of crop oil to RyzUp. The response to rate of RyzUp was linear. On average, RyzUp at 2 and 4 oz/A increased main culm length 7 and 14 cm, respectively. The second and third internodes below the panicle were increased an average of 3 and 6 cm, respectively, by the 2 and 4 oz/A rates of RyzUp. Most of the elongation of the main culm due to RyzUp was accounted for by elongation of the second and third internodes below the panicle.

Panicle length and the first and fourth internodes below the panicle were not significantly affected by RyzUp. Panicle length ranged between 20 and 21 cm.
The length of the first internode below the panicle ranged between 30 and 31 cm, and the length of the fourth internode below the panicle was a constant 9 cm.

At harvest, height of the stubble remaining after harvest was the only factor measured, which was significantly affected by RyzUp (Table 2). The response was dependent on rate of RyzUp and independent of crop oil addition to RyzUp. On average, stubble height was increased 5 and 8 cm by the 2 and 4 oz/A rates of RyzUp. Grain moisture and yield and milling yield were unaffected by RyzUp. Grain moisture ranged between 18.7 and 19.1%, and grain yield ranged between 6876 and 7273 lb/A. Total milling yield ranged between 64.9 and 66.4%, and whole milling yield ranged between 56.3 and 58.6%.

Ratoon Crop -- Mature plant height, grain moisture, and grain yield were not significantly affected by application of RyzUp to the main crop (Table 3). Plant height ranged from 68 to 70 cm. Grain moisture ranged from 16.4 to 16.6% and grain yield ranged from 2394 to 2601 lb/A.

Total Crop -- Grain yield of the total crop (main + ratoon) was not significantly affected by RyzUp application to the main crop (Table 3). Grain yield ranged between 9401 to 9874 lb/A.

Table 1. The effect of RyzUp (gibberellic acid) and crop oil applied during late boot on stem elongation in semidwarf rice *(Oryza sativa* 'LEMONT'). Rice Research Station, Crowley, LA. 1991.

RyzUp Rate (oz/A)	Clean Crop (qt/A)	Main Culm Length (cm)	Panicle Length (cm)	Internode Number[1]			
				1	2	3	4
				---------Length (cm)---------			
0	0	87e[2]	22a	31a	12c	10b	9a
2	0	92cd	21a	30a	15b	14a	9a
4	0	100ab	22a	30a	17ab	16a	9a
0	1	87de	21a	31a	12c	10b	9a
2	1	96bc	21a	30a	16b	13a	9a
4	1	103a	21a	30a	19a	16a	9a

[1] Internode number 1 = the first internode below the panicle.
[2] Means in a column followed by the same letter are not significantly different (P=.05) using the Duncan's multiple range test.

Table 2. The effect of RyzUp (gibberellic acid) and crop oil applied during late boot on grain production and quality in semidwarf rice *(Oryza sativa* 'LEMONT'). Rice Research Station, Crowley, LA. 1991.

RyzUp Rate (oz/A)	Clean Crop (qt/A)	Grain Moisture (%)	Grain Yield[1] (lb/A)	Milling Yield % Total	Milling Yield % Whole	Stubble Height (cm)
0	0	18.7a[2]	7160a	66.1a	58.0a	33c
2	0	19.0a	6885a	64.9a	57.6a	36bc
4	0	19.0a	7013a	65.2a	57.2a	40ab
0	1	18.7a	7215a	65.7a	58.1a	32c
2	1	18.8a	7273a	65.4a	56.3a	39ab
4	1	19.1a	6876a	66.4a	58.6a	41a

[1] Adjusted to 12% moisture.
[2] Means in a column followed by the same letter are not significantly different (P=.05) using the Duncan's multiple range test.

Table 3. The effect of RyzUp (gibberellic acid) applied during late boot of the main crop on ratoon crop and total crop production in semidwarf rice (*Oryza sativa* 'LEMONT'). Rice Research Station, Crowley, LA. 1991.

RyzUp Rate (lb/A)	Crop Oil (qt/A)	Plant Height (cm)	Ratoon Crop Grain Moisture (%)	Ratoon Crop Grain Yield[1] (lb/A)	Total Crop Grain Yield[1] (lb/A)
0	0	70a[2]	16.4a	2563a	9723a
2	0	69a	16.6a	2583a	9470a
4	0	69a	16.4a	2394a	9406a
0	1	68a	16.5a	2590a	9805a
2	1	68a	16.6a	2601a	9874a
4	1	69a	16.5a	2526a	9401a

[1] Adjusted to 12% moisture.
[2] Means in a column followed by the same letter are not significantly different (P=.05) using the Duncan's multiple range test.

RED RICE STUDIES

R.T. Dunand, J.B. Baker, R.R. Dilly, Jr., and G.A. Meche

Experiment: Herbicides and Plant Growth Regulators for Red Rice (Oryza sativa L.) Control and Seedhead Suppression in Rice (Oryza sativa 'MAYBELLE')

Location: Rice Research Station, Crowley, LA (South Unit)

Variety: Maybelle

Seeding Rate: 150 lb/A

Planting Date: 11 April 91

Row Spacing: Water-seeded: seed were soaked in water for 24 hr beginning on 9 April; seed were kept moist for 24 hr following draining before sowing by airplane.

Fertilizer: 20-10-10 with 1.2% zinc at 500 lb/A, preplant incorporated, 11 April

Plot Size: 640 ft^2 - 8 x 80 ft

Treated Area: 640 ft^2 - 8 x 80 ft

Treatment(s): Herbicides

Bolero 8EC - 0.5 gal/A, preplant surface, 8 April
Ordram 8E - 0.5 gal/A, preplant incorporated, 8 April

Plant Growth Regulators

Embark 2-S - 1 pt/A at late boot, 17 June and dough stage, 8 July

Royal MH-30 SG - 1.25 and 2.5 lb/A at milk stage, 3 July; dough stage (9 July)

Sprayer: CO_2-driven, hand-held, 32 psi, 15 GPA, 80015 nozzles

Pertinent Rainfall: No significant rainfall within 6 hours following applications

Herbicide(s): Stam M4 (3 qt/A) by airplane, 14 May
Londax (2 oz/A) by airplane, 22 May

Insecticide(s): Furadan (17 lb/A) by airplane, 20 May

Fungicide(s): none

Emergence: 11 April (seeded germinated seed)

Permanent Flood: 17 April

Harvest Date: 25 July

Harvested Area: 640 ft^2 - 8 x 80 ft

Exp. Design: Randomized complete block (4 replications)

Water Management: Flooded (1 to 2 inches) on 11 April for seeding; drained on 13 April and permanent flood (3 to 4 inches) on 17 April; drained for harvest on 10 July

Comments: Stand of red rice was unaffected by preplant herbicides and panicle density of red rice was reduced by both preplant Bolero and seedhead suppressants (Table 1). Preplant Ordram reduced red rice panicle density by 6 panicles/sq yd. Seedhead suppressants were more effective in reducing red rice panicle production. Embark reduced red rice panicle density by 13 panicles/sq yd and Royal MH-30 SG at the high rate and dough stage timing reduced red rice panicle density by 16 panicles/sq yd. Preplant herbicides and seedhead suppressants together almost eliminated red rice panicle production. Royal MH-30 SG at the milk stage timing and high rate eliminated red rice panicle production.

Stand and panicle production of Maybelle were not significantly affected by preplant herbicides or seedhead suppressants (Table 1). In the control, stand and panicle density of Maybelle were 153 plants/sq yd and 324 panicles/sq yd. Preplant herbicide and seedhead suppressant treatments resulted in stands ranging from 126 to 162 plants/sq yd and panicle densities ranging from 297 to 378 panicles/sq yd.

Maturity was unaffected and grain yield was reduced by most treatments (Table 2). Bolero, Embark, and Royal MH-30 SG reduced grain yield. Bolero alone significantly reduced grain yield. Following Bolero with seedhead suppressants had no additional affect on grain yield. Seedhead suppressants alone, with the exception of Royal MH-30 SG at the lower rate and later timing and following Ordram, reduced grain yield. Yield reductions ranged from approximately 600 lb/A for most treatments to almost 1000 lb/A for Royal MH-30 SG at the higher rate and earlier timing.

Red rice content of rough rice was low due to the low infestation of red rice and, consequently, grain quality and milling yield were unaffected (Table 2). Grade was 1 (highest possible) for all treatments, and the results are not presented. Total milling yield ranged from 67.0 to 68.5% for the preplant herbicide and seedhead suppressant treatments compared with 68.0% for the control. Whole milling yield ranged from 58.6 to 61.2% for the treatments compared with 60.3% for the control.

Table 1. The effect of preplant herbicides and late season plant growth regulators for red rice control on red (Oryza sativa L.) and white rice (Oryza sativa 'MAYBELLE') growth. Rice Research Station, Crowley, LA. 1991.

Herbicide/ plant growth regulator	Timing[1]	Rate (Amt/A)	Rice Type Red	White	Red	White
			--plants/yd²-		-panicles/yd²-	
Control	-	0	6ab[2]	153ab	19a	324ab
A. Bolero followed by plant growth regulators						
Bolero 8EC	pps	0.5 gal	5a-e	153ab	13b	342ab
Bolero 8EC	pps	0.5 gal				
fb Embark 2-S	lb	1 pt				
fb Embark 2-S	ds	1 pt	4cde	153ab	5cd	378a
Bolero EC	pps	0.5 gal				
fb Royal MH-30 SG	ds	1.25 lb	4b-e	135ab	6c	333ab
Bolero EC	pps	1 gal				
fb Royal MH-30 SG	ds	2.5 lb	3e	126b	0d	297b
B. Ordram followed by plant growth regulators						
Ordram 8E	ppi	0.5 gal	6abc	126b	15ab	360ab
Ordram 8E	ppi	0.5 gal				
fb Embark 2-S	lb	1 pt				
fb Embark 2-S	ds	1 pt	4de	162ab	6c	360ab
Ordram 8E	ppi	0.5 gal				
fb Royal MH-30 SG	ds	1.25 lb	4b-e	144ab	4cd	351ab
Ordram 8E						
fb Royal MH-30 SG	ds	2.5 lb	5a-d	126b	1cd	342ab
C. Plant growth regulators alone						
Embark 2-S	lb	1 pt				
fb Embark 2-S	ds	1 pt	4b-e	153ab	6cd	333ab
Royal MH-30 SG	ds	1.25 lb	5a-d	153ab	6cd	351ab
Royal MH-30 SG	ds	2.5 lb	5a-e	180a	3cd	378a
D. Royal MH-30 SG with a crop oil concentrate						
Royal MH-30 SG	ms	1.25 lb				
+ Clean Crop		.5 qt	6a	135ab	2cd	333ab
Royal MH-30 SG	ms	2.5 lb				
+ Clean Crop		.5 qt	5a-e	135ab	0d	324ab
Royal MH-30 SG	ms	1.25 lb				
+ Clean Crop		1 qt	4de	162ab	1cd	369ab
Royal MH-30 SG	ms	2.5 lb				
+ Clean Crop		1 qt	5a-d	144ab	0d	369ab

[1] ds = dough stage; lb = late boot; ms = milk stage; ppi = preplant incorporated; pps = preplant surface.
[2] Means in a column followed by the same letter are not significantly different (P=.05) using the Duncan's multiple range test.

Table 2. The effect of preplant herbicides and late season plant growth regulators for red rice (Oryza sativa L.) control on white rice (Oryza sativa 'MAYBELLE') production. Rice Research Station, Crowley, LA. 1991.

Herbicide/ plant growth regulator	Timing[2]	Rate (Amt/A)	Grain Moisture (%)	Grain Yield[1] (lb/A)	Milling Yield Total (%)	Milling Yield Whole (%)
Control	-	0	19.5a-d[3]	7404a	68.0a	60.3ab
A. Bolero followed by plant growth regulators						
Bolero 8EC	pps	0.5 gal	19.4a-d	6689bcd	67.3a	59.6ab
Bolero 8EC	pps	0.5 gal				
fb Embark 2-S	lb	1 pt				
fb Embark 2-S	ds	1 pt	18.5bcd	6798bcd	67.0a	58.6b
Bolero 8EC	pps	0.5 gal				
fb Royal						
MH-30 SG	ds	1.25 lb	19.9abc	6787bcd	67.2a	59.0ab
Bolero 8EC	pps	0.5 gal				
fb Royal						
MH-30 SG	ds	2.5 lb	20.7a	6513cd	68.4a	61.2a
B. Ordram followed by plant growth regulators						
Ordram 8E	ppi	0.5 gal	18.7bcd	6995abc	67.0a	58.9ab
Ordram 8E	ppi	0.5 gal				
fb Embark 2-S	lb	1 pt				
fb Embark 2-S	ds	1 pt	18.3cd	6798bcd	68.4a	59.4ab
Ordram 8E	ppi	0.5 gal				
fb Royal						
MH-30 SG	ds	1.25 lb	18.6bcd	6853bcd	67.5a	59.5ab
Ordram 8E						
fb Royal						
MH-30 SG	ds	2.5 lb	18.9bcd	6866bcd	68.2a	60.4ab
C. Plant growth regulators alone						
Embark 2-S	lb	1 pt				
fb Embark 2-S	ds	1 pt	18.9bcd	6877bcd	68.5a	60.6ab
Royal MH-30 SG	ds	1.25 lb	19.5a-d	7064ab	68.5a	61.0ab
Royal MH-30 SG	ds	2.5 lb	19.5a-d	6728bcd	68.6a	60.4ab
D. Royal MH-30 SG with a crop oil concentrate						
Royal MH-30 SG	ms	1.25 lb				
+ Clean Crop		0.5 qt	18.0d	6599bcd	67.9a	59.8ab
Royal MH-30 SG	ms	2.5 lb				
+ Clean Crop		0.5 qt	20.0ab	6888bcd	68.3a	60.7ab
Royal MH-30 SG	ms	1.25 lb				
+ Clean Crop		1 qt	19.0bcd	6807bcd	68.3a	60.8ab
Royal MH-30 SG	ms	2.5 lb				
+ Clean Crop		1 qt	18.8bcd	6441d	68.5a	61.2a

[1] Adjusted to 12% moisture.
[2] ds = dough stage; lb = late boot; ms = milk stage; ppi = preplant incorporated; pps = preplant surface.
[3] Means in a column followed by the same letter are not significantly different (P=.05) using the Duncan's multiple range test.

RED RICE STUDIES

R.T. Dunand, J.B. Baker, R.R. Dilly, Jr., and G.A. Meche

Experiment:	Fenoxaprop, Gibberellic Acid, and Maleic Hydrazide for Red Rice (Oryza sativa L.) Control and Seedhead Suppression in Rice (Oryza sativa 'MAYBELLE') as They Impact First and Second Crop White Rice Production
Location:	Rice Research Station, Crowley, LA (South Unit)
Variety:	Maybelle
Seeding Rate:	150 lb/A
Planting Date:	11 April 91
Row Spacing:	Water-seeded: seed were soaked in water for 24 hr beginning on 9 April; seed were kept moist for 24 hr following draining before sowing by airplane.
Fertilizer:	Main Crop
	20-10-10 with 1.2% zinc at 500 lb/A preplant incorporated, 11 April
	Ratoon Crop
	Ammonium Sulfate (21% N) at 350 lb/A by airplane, 9 August
Plot Size:	640 ft^2 - 8 x 80 ft
Treated Area:	640 ft^2 - 8 x 80 ft
Treatment(s):	Formulations (rates):
	Fenoxaprop
	Whip - .6 and 1.2 pt/A at 5- to 6-leaf stage (10 May)
	Gibberellic Acid
	RyzUp - 1 oz/A at 5- to 6-leaf stage (10 May)

Maleic Hydrazide

Royal MH-30 SG - 1.6, 2.5 and 3.3 lb/A at milk stage (3 July) and dough stage (9 July)

Sprayer: CO_2-driven, hand-held, 32 psi, 15 GPA, 80015 nozzles

Pertinent Rainfall: No significant rainfall within 6 hours following applications.

Herbicide(s): Stam M4 (3 qt/A) by airplane on 14 May
Londax (2 oz/A) by airplane on 22 May

Insecticide(s): Furadan (17 lb/A) by airplane on 20 May

Fungicide(s): None

Emergence: 11 April (seeded germinated seed)

Permanent Flood: 17 April (main crop); 21 August (ratoon crop)

Harvest Date: 26 July (main crop); 17 October (ratoon crop)

Harvested Area: 640 ft^2 - 8 x 80 ft

Exp. Design: Randomized complete block (4 replications)

Water Management: Flooded (1 to 2 inches) on 11 April for seeding; drained on 13 April and permanent flood (3 to 4 inches) on 17 April; drained for harvest on 10 July

Comments: Treatments used to control or suppress red rice in rice production were evaluated for direct effects on the rice crop. This study was conducted in an area with little to no red rice.

Whip significantly reduced plant height by approximately 15 to 20 cm (Table 1). RyzUp mixed with Whip had no effect on plant height.

Most treatments had little effect on grain production of the first crop (Table 1). Royal MH-30 SG applied at milk and dough stage at rates ranging from 1.6 to 3.3 lb/A had no significant effect on grain moisture or yield. The addition of crop oil to Royal MH-30 SG also had no effect. Similarly, Whip and Whip plus RyzUp had no significant effect on grain yield. Grain yield ranged between 7657 and 8229 lb/A. Whip (0.6 pt/A) plus RyzUp and Whip (1.2 pt/A) delayed maturity slightly. Grain moistures were 0.8 and 1.3% higher compared with the control.

Most treatments had little effect on grain production of the second crop and total crop (first + second crop) (Table 2). Second crop grain yield ranged between 2708 and 3360 lb/A. Total crop grain yield ranged between 10364 and 11302 lb/A. Maturity of the second crop was delayed by Whip. Grain moisture was increased by 1.4 to 2.6% by Whip independent of rate or mixture with RyzUp.

Table 1. The effect of Royal MH-30 SG (maleic hydrazide), RyzUp (gibberellic acid), and Whip (fenoxaprop) on rice (*Oryza sativa* 'MAYBELLE') production of the first crop. Rice Research Station, Crowley, LA. 1991.

Treatment	Timing[3]	Rate (Amt./A)	Plant height[1] (cm)	Grain Moisture (%)	Grain Yield[2] (lb/A)
Control	ms	0	63a[4]	15.6e	8075ab
	ds	0		16.0cde	7987ab
A. Royal MH-30 SG time and rate					
Royal MH-30 SG	ms	1.6 lb		15.8e	7909ab
		2.5 lb		16.0cde	7990ab
		3.3 lb		15.9e	7880ab
	ds	1.6 lb		15.7e	7979ab
		2.5 lb		15.6e	7910ab
		3.3 lb		15.7e	7876ab
B. Royal MH-30 SG and crop oil concentrate					
Royal MH-30 SG	ds	1.6 lb		15.9de	8037ab
+ Clean Crop		.5 qt			
Royal MH-30 SG		2.5 lb		16.0cde	7715b
+ Clean Crop		.5 qt			
Royal MH-30 SG		1.6 lb		16.0cde	7991ab
+ Clean Crop		1 qt			
Royal MH-30 SG		2.5 lb		15.7e	8229a
+ Clean Crop		1 qt			
C. Whip and RyzUp					
Whip	5-61	.6 pt	45b	16.5bcd	8005ab
Whip		.6 pt	44b	17.3a	7657b
+ RyzUp		1 oz			
+ Clean Crop		1 qt			
Whip		1.2 pt	45b	16.8ab	7885ab
Whip		1.2 pt	49b	16.6bc	7681b
+ RyzUp		1 oz			

[1] Measurements made 11 days after treatment at mid tiller stage of growth.
[2] Adjusted to 12% moisture.
[3] ds = dough stage; ms = milk stage; 5-61 = 5 to 6 leaf seedling.
[4] Means in a column followed by the same letter are not significantly different (P=.05) using the Duncan's multiple range test.

Table 2. The effect of Royal MH-30 SG (maleic hydrazide), RyzUp (gibberellic acid), and Whip (fenoxaprop) on rice (*Oryza sativa* 'MAYBELLE') production of the ratoon crop and the total crop (first + ratoon). Rice Research Station, Crowley, LA. 1991.

			Ratoon Crop		Total Crop
			Grain		Grain
		Rate	Moisture	Yield[1]	yield[1]
Treatment	Timing[2]	(Amt/A)	(%)	(lb/A)	(lb/A)
Control	ms	0	17.0def[3]	3142a-e	11217ab
	ds	0	17.2de	2891efg	10878bcd
A. Royal MH-30 SG time and rate					
Royal MH-30 SG	ms	1.6 lb	16.9def	3086b-f	10996abc
		2.5 lb	16.7efg	3065b-f	11055abc
		3.3 lb	15.7g	3254a-d	11134ab
	ds	1.6 lb	16.8efg	3276abc	11255ab
		2.5 lb	16.5efg	3392a	11302ab
		3.3 lb	16.3efg	3207a-d	11083ab
B. Royal MH-30 SG and crop oil concentrate					
Royal MH-30 SG	ds	1.6 lb	16.6efg	3119a-e	11156ab
+ Clean Crop		.5 qt			
Royal MH-30 SG		2.5 lb	15.9fg	3018c-f	10734bcd
+ Clean Crop		.5 qt			
Royal MH-30 SG		1.6 lb	17.9cd	2977c-g	10967bc
+ Clean Crop		1 qt			
Royal MH-30 SG		2.5 lb	16.4efg	3360ab	11589a
+ Clean Crop		1 qt			
C. Whip and RyzUp					
Whip	5-61	.6 pt	18.6abc	2952d-g	10957bc
Whip		.6 pt	19.0ab	2708g	10364d
+ RyzUp		1 oz			
+ Clean Crop		1 qt			
Whip		1.2 pt	19.6a	2800fg	10685bcd
Whip		1.2 pt	18.4bc	2789fg	10470cd
+ RyzUp		1 oz			

[1] Adjusted to 12% moisture.
[2] ds = dough stage; ms = milk stage; 5-61 = 5 to 6 leaf seedling.
[3] Means in a column followed by the same letter are not significantly different (P=.05) using the Duncan's multiple range test.

RED RICE STUDIES

R.T. Dunand, J.B. Baker, R.R. Dilly, Jr., and G.A. Meche

Experiment:	Maleic Hydrazide and Cultural Practices for Red Rice (*Oryza sativa* L.) Seed Suppression on Fallow Land
Location:	Rice Research Station, Crowley, LA (South Unit)
Variety:	Red Rice
Seeding Rate:	Volunteer, natural infestation
Planting Date:	N/A
Row Spacing:	N/A
Fertilizer:	None
Plot Size:	75 ft^2 - 5 x 15 ft
Treated Area:	75 ft^2 - 5 x 15 ft
Treatment(s):	Formulation (rate):

Maleic Hydrazide

Royal MH-30 SG - 2.5 lb/A at first heading, 20 July
- 2.5 lb/A following mowing, 22 July

Cultural Management

Tillage - Rototilled to a depth of 3 to 4 inches, 20 July

Mow - Cut with a weedeater to a height of 3 to 4 inches, 20 July

Sprayer:	CO_2-driven, hand-held, 32 psi, 15 GPA, 80015 nozzles
Pertinent Rainfall:	No significant rainfall within 6 hours following applications
Herbicide(s):	None
Insecticide(s):	None

Fungicide(s): None

Emergence: mid April

Permanent Flood: None

Harvest Date: 30 August (termination date)

Harvested Area: 5 panicles/plot; panicle counts taken on different areas depending on panicle density (control - 3 x 15 ft, rototilled - 5 x 15 ft, mow - 7.5 x 15 ft, Royal MH-30 SG - 3 x 15 ft, mow + Royal MH-30 SG - 3 x 15 ft)

Exp. Design: Randomized complete block (3 replications)

Water Management: None

Comments: Chemical and cultural methods reduced red rice panicle and seed production (Table 1). Tillage at first heading of red rice eliminated panicle and seed production. Mowing, mowing followed by Royal MH-30 SG, and Royal MH-30 SG alone, although statistically equally effective at reducing panicle and seed production by 50 and 75%, respectively, were not as effective as tillage.

Seeds from unsuppressed panicles were germinated at room temperature (23°C) for three weeks. Twenty seeds were placed in petri dishes on moistened filter paper. The percent of seed germinating and the percent seeds producing viable seedlings were determined. Expressed on the basis of seed/ft^2 there were 29, 14, 7, 8, and 0 non-germinating seeds per square foot for the control, Royal MH-30 SG, mow, mow followed by Royal MH-30 SG, and tillage treatments, respectively (Table 2). Of the seeds that germinated, 1, 5, 0, 0, and 0 seeds/ft^2 died immediately following germination for the five treatments, respectively. Of the original seeds produced, there were 56, 6, 9, 6, and 0 seeds/ft^2 that produced viable seedlings for the control, Royal MH-30 SG, mow, mow followed by Royal MH-30 SG, and tillage treatments, respectively. This represents effectively 90% control on average by Royal MH-30 SG, whether applied alone or following mowing.

Table 1. The effect of Royal MH-30 SG (maleic hydrazide) and cultural practices on panicle development of red rice (Oryza sativa L.) in management of fallow land. Rice Research Station, Crowley, LA. 1991.

Treatment	Panicle density (pan./yd.^{2})	Florets Total	Florets Sterile	Florets Seed	Seed density (seed/ft^2)
		-------Number/panicle-------			
Control	15a[1]	62a	10bc	52a	86a
Royal MH-30 SG[2]	10b	66a	42ab	24b	25b
Mow[3]	7b	66a	45a	21b	16bc
Mow[3] fb Royal MH-30 SG	7b	46a	33abc	13b	14bc
Tillage[4]	0c	0b	0c	0c	0c

[1] Means in a column followed by the same letter are not significantly different (P=.05) using the Duncan's multiple range test.
[2] Applied at the rate of 1.5 lb/A during first heading.
[3] Cut with a weed eater to a height of 3 to 4 inches.
[4] Rototilled to a depth of 3 to 4 inches with a garden tiller.

Table 2. The effect of Royal MH-30 SG (maleic hydrazide) and cultural practices on seed production of red rice in management of fallow land. Rice Research Station, Crowley, LA. 1991.

Treatment	Seed density	Non-germinating seed density	Non-viable germinating seed density	Viable seed density
	------------seed/ft^2------------			
Control	86a	29a	1b	56a
Royal MH-30 SG	25b	14b	5a	6b
Mow	16bc	7bc	0b	9b
Mow fb Royal MH-30 SG	14bc	8b	0b	6b
Tillage	0c	0c	0b	0c

YIELD ENHANCEMENT STUDIES

R.T. Dunand, R.R. Dilly, Jr. and G.A. Meche

Experiment:	Chitosan and Water-Seeded Rice (Oryza sativa 'LEMONT')
Location:	Rice Research Station, Crowley, LA (North Unit)
Variety:	Lemont
Seeding Rate:	135 lb/A
Planting Date:	19 June 91
Row Spacing:	Water-seeded (dry seed sown into the flood)
Fertilizer:	20-10-10 with 1.2% Zn at 600 lb/A, 5 June Urea (46% N) topdress, 15 July
Plot Size:	150 ft^2 - 5 x 30 ft
Treated Area:	150 ft^2 - 5 x 30 ft
Treatment(s):	Formulation (rate): Chitosan Ceres 211 (40 g chitosan/A) Viscosity: 100, 200, and 300 cps Timing: Seed Treatment
Sprayer:	N/A
Pertinent Rainfall:	None
Herbicide(s):	Stam M4 + Basagran (3 qt + 2 pt/A) by airplane, 2 July Stam M4 + Bolero 8EC (2 qt + 1 pt/A) by airplane, 15 July Ordram 15G (20 lb/A) by airplane, 18 July Londax (2 oz/A) by airplane, 25 July Bolero 10G (40 lb/A) by airplane, 31 July

Insecticide(s): Furadan 3G (17 lb/A) by airplane, 31 July
Sevin 4F (2 pt/A) by airplane, 28 August

Fungicide(s): Benlate 50 DF (1 lb/A) by airplane, 18, 19, and 25 July, 21 August, 6 and 18 September

Emergence: 26 June

Permanent Flood: 16 July

Harvest Date: 9 October

Harvested Area: 150 ft^2 - 5 x 30 ft

Exp. Design: Randomized complete block (4 replications)

Comments: The results show Ceres 211 had a significant effect on grain yield (Table 1). Ceres 211 (300 cps) caused an increase in grain yield of 308 lb/A compared with the control. There was no significant difference in grain yield between the Ceres 211 treatments (100, 200, and 300 cps) or the control and Ceres 211 treatments with viscosities of 100 and 200 cps. Grain yields were low, ranging from 4229 to 4537 lb/A.

Ceres 211 had no significant effect on mature plant height or crop maturity. Mature plant height ranged between 100 and 102 cm and grain moisture ranged between 21.9 and 22.5%.

Table 1. The effect of Ceres 211 (chitosan) on semidwarf rice (*Oryza sativa* 'LEMONT') production. Rice Research Station, Crowley, LA. 1991.

Ceres 211 viscosity (cps)	Grain Yield[1] (lb/A)	Grain Moisture (%)	Plant Height (cm)
Control	4229b[2]	22.1a	102a
100	4318ab	22.5a	100a
200	4384ab	22.4a	101a
300	4537a	21.9a	101a

[1] Adjusted to 12% moisture.
[2] Means in a column followed by the same letter are not signficantly different (P=.05) using the Duncan's multiple range test.

YIELD ENHANCEMENT STUDIES

R.T. Dunand, R.R. Dilly, Jr., and G.A. Meche

Experiment: PGR-IV, PHCA-K, and Ratoon Crop Production in Semidwarf Rice (*Oryza sativa* 'LEMONT')

Location: Rice Research Station, Crowley, LA (South Unit)

Variety: Lemont

Seeding Rate: 75 lb/A

Planting Date: 10 April 91

Row Spacing: 7-inch

Fertilizer: Main crop

7-21-21 with 1.2% zinc at 300 lb/A drilled at planting, 10 April; Urea (46% N) at 200 lb/A by airplane, 20 May

Ratoon crop (see treatments)

Plot Size: 494 ft^2 - 7.6 (13 rows) x 65 ft

Treated Area: 494 ft^2 - 7.6 x 28 ft

Treatment(s): Formulation (rates):

Fertilizer and Plant Growth Regulator

Urea (100 lb/A)
Urea (100 lb/A) impregnated with PGR-IV (6 oz/A)

Timing: Preflood, 21 August

Plant Growth Regulator

PHCA-K (1 qt/A)

Timing: Panicle initiation, 5 September

Sprayer: CO_2-driven, hand-held, 32 psi, 15 GPA, 80015 nozzles

Pertinent Rainfall: 0.5 inches approximately 4 hours after treatment

Herbicide(s): Stam M4+Bolero 8EC (3 qt + 2 pt), 2 May

Insecticide(s): Furadan (17 lb/A) by airplane, 31 May

Fungicide(s): Tilt (10 oz/A) by airplane, 2 July
Benlate (1 lb/A) by airplane, 15 July

Emergence: 16 April

Permanent Flood: 21 May (main crop); 23 August (ratoon crop)

Harvest Date: 8 August (main crop); 14 November (ratoon crop)

Harvested Area: 494 ft^2 - 7.6 x 65 ft

Exp. Design: Randomized complete block (4 replications)

Comments: Crop production of the ratoon crop was not significantly affected by PGR-IV and PHCA-K (Table 1). Mature plant height ranged between 67 and 68 cm. Grain moisture ranged between 17.4 and 17.6% and grain yield ranged between 1935 and 2082 lb/A.

Table 1. The effects of PGR-IV impregnated urea and PHCA-K on ratoon crop production in semidwarf rice (*Oryza sativa* 'LEMONT'). Rice Research Station, Crowley, LA. 1991.

PGR-IV (oz/A)	PHCA-K (qt/A)	Plant Height (cm)	Grain Moisture (%)	Grain Yield[1] (lb/A)
0	0	68a[2]	17.4a	1960a
	1	67a	17.4a	1935a
6	0	68a	17.6a	2082a
	1	67a	17.6a	2029a

[1] Adjusted to 12% moisture.
[2] Means in a column followed by the same letter are not significantly different (P=.05) using the Duncan's multiple range test.

YIELD ENHANCEMENT STUDIES

R.T. Dunand, R.R. Dilly, Jr., and G.A. Meche

Experiment: PGR-IV and Yield Enhancement in Semidwarf Rice (Oryza sativa 'LEMONT')

Location: Rice Research Station, Crowley, LA

Variety: Lemont

Seeding Rate: 100 lb/A

Planting Date: 20 June 91

Row Spacing: 7-inch

Fertilizer: 7-21-21 with 1.2% Zn at 300 lb/A preplant incorporated, 20 June; Urea (46% N) at 200 lb/A (topdress), 15 July

Plot Size: 228 ft^2 - 7.6 (13 rows) x 30 ft

Treated Area: 228 ft^2 - 7.6 x 30 ft

Treatment(s): Formulation(s) (rate):

PGR-IV (4, 6 and 8 oz/A)
Stam M4 (1 gal/A)

Timing: 3- to 5-leaf stage, 9 July
5-leaf stage, 18 July
Panicle initiation (PI), 12 August

Sprayer: CO_2-driven, hand-held, 32 psi, 15 GPA, 80015 nozzles

Pertinent Rainfall: 9 July, .13 inches; 18 July, .39 inches; 12 August, .09 inches

Herbicide(s): Stam M4 + Basagran (3 qt + 2 pt/A) by airplane, 2 July
Stam M4 + Bolero 8EC (2 qt + 1 pt/A) by airplane, 15 July
Ordram 15G (20 lb/A) by airplane, 18 July
Londax (2 oz/A) by airplane, 25 July
Bolero 10G (40 lb/A) by airplane, 31 July

Insecticide(s): Furadan 3G (17 lb/A) by airplane, 31 July
Sevin 4F (2 pt/A) by airplane, 28 August

Fungicide(s): Benlate 50 DF (1 lb/A) by airplane, 18, 19 and 25 July, 21 August, 6 and 18 September

Emergence: 25 June

Permanent Flood: 16 July

Harvest Date: 9 October

Harvested Area: 228 ft^2 - 7.6 x 30 ft

Exp. Design: Randomized complete block (4 replications)

Comments: Plant stature and maturity were not affected by PGR-IV applications. Mature plant heights ranged between 112 and 114 cm and grain moistures ranged between 21.1 and 22.0%.

Grain yield was affected by PGR-IV. PGR-IV applied at the 5-leaf stage significantly decreased grain yield below the other treatments. Grain yield from PGR-IV applied at the 5-leaf stage was 3213 lb/A compared to grain yields ranging between 3445 and 3608 lb/A for the other treatments.

Table 1. The effect of PGR-IV on semidwarf rice (*Oryza sativa* 'LEMONT') production. Rice Research Station, Crowley, LA. 1991.

Chemical	Rate (Amount/A)	Timing (Growth Stage)	Plant Height (cm)	Grain Moisture (%)	Grain Yield[1] (lb/A)
Control			114a[2]	21.5a	3542a
PGR-IV	8 oz	5 leaf	112a	21.1a	3213b
PGR-IV fb PGR-IV	4 oz	3-5 leaf, PI[3]	112a	21.4a	3608a
PGR-IV	6 oz	3-5 leaf	113a	22.0a	3445a
PGR-IV + Stam M4	8 oz + 4 qt	3-5 leaf	114a	22.0a	3585a

[1] Adjusted to 12% moisture.
[2] Means in a column followed by the same letter are not significantly different (P=.05) using the Duncan's multiple range test.
[3] Panicle initiation, approximately 1 week after internode elongation begins.

RICE DISEASE CONTROL STUDIES[1]

D.E. Groth, M. Frey, J. Nugent, P.K. Bollich, and M.C. Rush

1991 SOIL FUNGICIDE X SEED SOAKING AND TREATMENT

Location: Rice Research Station, Crowley, LA

Soil Type: Crowley silt loam

Variety/Seed Rate: Lemont, 120 lb/A

Planting Method/Date: Water-seeded, Mar 28

Emergence Date: Apr 6

Fertilization: Preplant 120-0-0, Mar 27; topdressed, 21-0-0, June 6

Plot Size: 10 x 20 ft

Water Management: Flooded, Mar 28; drained, Apr 1; flooded, Apr 5; drained, Apr 23; flooded, Apr 24

Herbicides: 3 qt Propanil + 1 qt Basagran/A, Apr 23

Insecticides: 17 lb/A Furadan, May 7 and June 6

Fungicides: Ridomil 2EC (Metalaxyl)

Application Equipment: CO_2 backpack sprayer, 8002 tips, 10 gal/A

Application Dates: Applied Ridomil (preplant), Mar 28

Drained: July 18

Harvest: Aug 2

Experimental Design: Randomized block design with four replications

Disease Ratings: Visual water mold signs were noted Apr 12

[1] This research is supported in part by funds provided by rice producers through the Louisiana Rice Research Board.

Results: See Table 1.

Comments: Water mold severity was high. Lowest stand densities were still in acceptable range. Sheath blight was severe in thicker stands.

Table 1. The effect of seed treatment, seed soaking, and soil applied fungicide on plant stand densities and rice yield. Rice Research Station, Crowley, LA. 1991.

Soil Treatment/ Seed treatment	Rate soil fungicide (lb ai/A)	Plant stand (pl/ft^2)	Yield (lb/A)
Check - untreated/ Untrt - unsoaked seed		8.7 c	6811.5 a
Check - untreated/ Untrt - soaked seeds		10.6 c	6944.0 a
Check - untreated/ Trt - unsoaked seeds		12.3 bc	6715.3 a
Check - untreated/ Trt - soaked seeds		19.1 a	6778.3 a
Ridomil 2EC/ Untrt - unsoaked seeds	0.25 PRPL	12.9 bc	6881.8 a
Ridomil 2EC/ Untrt - soaked seeds	0.25 PRPL	18.7 a	6932.5 a
Ridomil 2EC/ Trt - unsoaked seeds	0.25 PRPL	17.5 ab	7307.5a
Ridomil 2 EC/ Trt - soaked seeds	0.25 PRPL	21.3 a	6905.0a
LSD (.05) =		5.5	706.8
Standard Dev. =		3.71	480.5
CV =		24.51	6.95

Means followed by same letter do not significantly differ (Duncan's MRT, P = .05).

1991 PLANTING RATE X SOIL FUNGICIDE TRIAL

Location: Rice Research Station, Crowley, LA

Soil Type: Crowley silt loam

Variety/Seed Rate: Lemont, 60 and 120 lb/A

Planting Method/Date: Water-seeded, Apr 5

Emergence Date: Apr 12

Fertilization: Preplant 75-35-35, Apr 4; topdressed, 21-0-0, June 6

Plot Size: 10 x 20 ft

Water Management: Flooded, Apr 5; drained, Apr 12; flooded, May 3

Herbicides: 4 qt Propanil, May 2; 2 oz/A Londax, May 7

Insecticides: 17 lb/A Furadan, May 7 and June 6

Fungicides: Ridomil 2EC (Metalaxyl) 1 pt/A (0.25 lb ai / A)

Application Equipment: CO_2 backpack sprayer, 8002 tips, 10 gal/A

Application Dates: Applied Ridomil (preplant), Apr 4

Drained: Aug 2

Harvest: Aug 20

Experimental Design: Randomized block design with four replications

Disease Ratings: Visual water mold signs were noted Apr 12

Results: See Table 2.

Comments: Plant stands were very thin in trial. All were below acceptable levels but yield were fair.

Table 2. Effect of planting rate and soil fungicide on plant stand and rice yield. Rice Research Station, Crowley, LA. 1991.

Seeding rate/ Soil treatment	Rate soil fungicide (lb ai/A)	Plant stand (pl/ft^2)	Yield (lb/A)
120 lb/A/ Untreated soil		5.5 a	5146.8 ab
120 lb/A/ Ridomil 2EC	0.25 PRPL	6.0 a	5432.5 a
60 lb/A/ Untreated soil		4.8 a	4533.3 b
60 lb/A/ Ridomil 2EC	0.25 PRPL	5.3 a	5074.0 ab
LSD (.05) =		3.5	775.2
Standard Dev. =		2.19	484.64
CV =		40.78	9.60

Means followed by same letter do not significantly differ (Duncan's MRT, P = .05).

1991 VARIETY TRIAL

Location: Rice Research Station, Crowley, LA

Soil Type: Crowley silt loam

Variety/Seed Rate: 3-4 gm/row

Planting Method/Date: Hege tray planter, Apr 8

Emergence Date: Apr 14

Fertilization: Preplant 60-60-60, Apr 8; one half of field fertilized 120-0-0, May 2; other half of field fertilized 60-0-0, May 2; entire field topdressed 21-0-0, June 6

Plot Size: 3 x 2 ft rows

Water Management: Permanent flood, May 3

Herbicides: 3 qt Propanil + 1 qt Basagran/A, Apr 23; 4 qt Propanil/A, May 1; 2 oz/A Londax, May 7

Insecticides: 17 lb/A Furadan, May 7 and June 6

Fungicides: None

Application Dates: Inoculated for sheath blight, May 31 (3-5 ml/row)

Drained: July 29

Harvest: N/A

Experimental Design: Randomized block design with four replications

Disease Ratings: July 1

Results: See Table 3.

Comments: Sheath blight and blast severity were high due to heavy rainfall throughout the season. Other diseases were moderate in severity.

Table 3. Reaction of rice varieties to sheath blight, narrow brown spot, leaf smut, and neck blast. Rice Research Station, Crowley, LA. 1991.

Variety	Sheath blight (0-9)	Narrow brown spot (0-9)	Leaf smut (0-9)	% Neck blast
Alan	5.8 f-j	0.3 i	5.5 b	13.8 def
Tebonnet	7.3 a-d	4.0 ab	4.8 bcd	8.8 d-j
Texmont	8.0 a	0.3 i	1.8 jk	31.3 b
Maybelle	8.0 a	0.5 hi	5.0 bc	10.0 d-h
Jackson	7.3 a-d	0.0 i	3.8 c-g	12.5 d-g
AS 3510	7.0 a-e	4.5 a	7.3 a	12.5 d-g
Skybonnet	7.5 abc	2.8 cde	4.3 b-e	10.0 d-h
Labelle	7.8 ab	3.5 abc	5.0 bc	6.3 f-k
Millie	6.0 e-i	2.8 cde	3.8 c-g	10.0 d-h
RT 7015	7.5 abc	0.5 hi	4.8 bcd	28.8 b
Rosemont	8.0 a	0.3 i	2.0 ijk	21.3 c
Gulfmont	7.0 a-e	1.3 f-i	2.3 h-k	5.3 g-k
Lemont	7.8 ab	3.8 abc	4.3 b-e	6.3 f-k
Lacassine	7.0 a-e	2.3 def	1.3 klm	7.5 efg
Katy	5.3 h-k	1.0 f-i	3.3 e-i	2.0 h-k
V7817	6.5 c-g	1.0 f-i	0.3 lm	2.0 h-k
Newbonnet	5.8 f-j	1.8 e-h	2.8 f-j	16.3 cd
Della	5.3 h-k	0.8 ghi	2.8 f-j	6.3 f-k
Dellmont	7.0 a-e	2.8 cde	2.8 f-j	5.3 g-k
Jasmine 85	3.3 m	0.0 i	0.0 m	0.0 k
Toro-2	6.3 d-h	0.8 ghi	1.3 klm	5.3 g-k
Mars	4.8 jkl	2.3 def	4.0 cde	8.8 d-j

Continued.

Table 3. Continued.

Variety	Sheath blight (0-9)	Narrow brown spot (0-9)	Leaf smut (0-9)	% Neck blast
Mercury	5.3 h-k	2.0 efg	4.0 cde	15.0 cde
Rico I	5.0 i-l	0.3 i	3.5 d-h	5.3 g-k
Saturn	5.5 g-k	4.3 ab	4.8 bcd	3.0 h-k
V4716	5.8 f-j	0.0 i	0.3 lm	10.0 d-h
Orion	5.0 i-l	0.8ghi	4.3 b-e	0.5 jk
Bengal	4.5 kl	0.0 i	2.3 h-k	6.5 f-k
Cypress	7.0 a-e	0.0 i	3.5 d-h	9.3 d-i
URN 1	7.8 ab	4.0 ab	7.3 a	76.3 a
URN 72	6.8 b-f	0.8 ghi	0.3 lm	5.3 g-k
URN 46	7.3 a-d	2.0 efg	1.5 jkl	3.0 h-k
URN 69	4.8 jkl	0.3 i	2.5 g-k	1.0 ijk
LA 2215	6.0 e-i	2.0 efg	2.8 f-j	7.5 efg
RAX 2061	6.3 d-h	0.3 i	3.5 d-h	1.5 h-k
RAX 2222	4.0 lm	0.5 hi	0.0 m	0.0 k
RAX 2224	5.3 h-k	0.0 i	0.3 lm	0.0 k
AS 3058	6.5 c-g	0.5 hi	4.5 b-e	2.0 h-k
LSD (.05) =	0.9	1.1	1.2	6.9
Standard Dev. =	0.63	0.77	0.85	4.91
CV =	10.04	52.56	27.32	49.99

Means followed by same letter do not significantly differ (Duncan's MRT, P = .05).

1991 UNIFORM DISEASE NURSERY

Location: Rice Research Station, Crowley, LA

Soil Type: Crowley silt loam

Variety/Seed Rate: 3-4 gm/3 ft row

Planting Method/Date: Hege tray planter, Apr 8

Emergence Date: Apr 14

Fertilization: Preplant 60-60-60, Apr 8; 120-0-0, May 2; 21-0-0, June 6

Plot Size: 3 ft rows

Water Management: Permanent flood, Apr 3

Herbicides: 3 qt Propanil + 1 qt Basagran/A, Apr 23; 4 qt Propanil, May 1;
2 oz/A Londax, May 7

Insecticides: 17 lb/A Furadan, May 7 and June 6

Fungicides: None

Application Equipment: CO_2 backpack sprayer, 8002 tips, 1 ' gal/A

Application Dates: Inoculated for sheath blight, May 31 (3-5 ml/row)

Drained: July 29

Harvest: N/A

Disease Ratings: Sheath blight data taken July 24 and 25;
blast data taken July 24 and September 14

Results: See Table 4.

Comments: Sheath blight and blast severity were high; other diseases were moderate.

Table 4. Reaction of rice varieties in the Uniform Rice Nursery to sheath blight, leaf smut, narrow brown spot, and leaf blast. Rice Research Station, Crowley, LA. 1991.

Variety	Sheath blight*	Leaf smut*	Narrow brown spot*	Leaf blast*
Lacassine	7	1	1	5
Katy	6	5	3	2
Millie	6	2	3	4
Labelle	7	5	4	4
Tebonnet	7	3	5	3
Skybonnet	7	5	3	4
Gulfmont	7	3	2	4
Toro-2	7	1	0	5
Lemont	7	5	5	4
L203	7	3	0	8
Newbonnet	5	3	0	6
Maybelle	8	5	3	6
Rosemont	8	2	0	6
Alan	6	0	5	5
Texmont	8	2	0	4
Mars	5	4	3	6
Rexmont	6	3	3	6
Mercury	6	4	2	6
Rico 1	5	4	0	5
Jasmine 85	2	0	1	0
Dellmont	7	3	3	4
Della	6	5	0	7
Orion	4	3	1	3

* Ratings based on 0 to 9 scale where 0 = no disease (immune) and 9 = maximum disease (very susceptible).

1991 ADVANCED FUNGICIDE TRIAL

Location: Rice Research Station, Crowley, LA

Soil Type: Crowley silt loam

Variety/Seed Rate: Lemont, 110 lb/A

Planting Method/Date: Kincaid cone planter (drill-seeded), Apr 8

Emergence Date: Apr 15

Fertilization: Preplant 60-60-60, Apr 8; 120-0-0, May 2; 21-0-0, June 6

Plot Size: 3.5 x 16 ft

Water Management: Permanent flood, May 3

Herbicides: 3 qt Propanil + 1 qt Basagran/A, Apr 23; 2 oz/A Londax, May 7

Insecticides: Furadan 17 lb/A, May 7 and June 6

Fungicides: Applied at panicle differentiation (PD), boot (B), and heading (H)

Application Equipment: CO_2 backpack sprayer, 8002 tips, 10 gal/A

Application Dates: Inoculated for sheath blight, May 31 (100 ml/plot) applied fungicides, June 7, June 21, and July 9

Drained: July 24

Harvest: Aug 7-8

Experimental Design: Randomized block design with four replications

Disease Ratings: Sheath blight data taken, July 24

Results: See Table 5.

Comments: Sheath blight severity was high; other diseases were moderate in severity.

Table 5. Effects of rice foliar fungicides on sheath blight, narrow brown spot, and leaf smut control and rice yield. Rice Research Station, Crowley, LA. 1991.

Treatment	Rate	Timing	Sheath blight Tillers infected (%)	Sheath blight Severity (0-9)	Narrow brown spot (0-9)	Leaf smut (0-9)	Yield (lb/A)	Change from check
Uninoculated check			3.8 e	13.5 d	4.3 ab	4.3 ab	6634.0 a	1102.0 a
Inoculated check			7.0 ab	78.0 ab	4.5 a	4.5 a	5532.2 fg	0.0 fg
Rovral 50 WG	1.0 lb pr/A	B+H	6.3 a-d	53.5 bc	3.8 a-d	3.0 a-f	5935.8 b-f	403.8 b-f
Rovral 4 SC	1.0 pt pr/A	B+H	6.0 bcd	70.0 abc	3.0 b-g	3.5 a-d	6009.5 b-f	477.5 b-f
Rovral 4 SC Triton CS-7 8.33 EC	1.0 pt pr/A 0.25% v/v	B+H B+H	6.5 abc	69.0 abc	2.8 c-h	1.8 d-j	5998.8 b-f	466.8 b-f
Rovral 4 SC Pentetrator 3 8.33 EC	1.0 pt pr/A 0.5% v/v	B+H B+H	6.0 bcd	49.0 bc	4.0 abc	2.0 c-i	5757.8 d-g	225.8 d-g
Rovral 4 SC Crop oil 8.33 EC	1.0 pt pr/A 0.75% v/v	B+H B+H	6.8 ab	78.5 ab	3.5 a-e	3.5 a-d	5749.0 d-g	217.0 d-g
EXP10064B 1.67 SC Rovral 4 SC	0.18 lb ai/A 1.0 pt pr/A	B+H B+H	5.3 d	50.0 bc	0.8 ij	0.3 jk	6090.0 b-e	558.0 b-e
Rovral 4 SC	1.0 pt pr/A	PD+B	7.0 ab	65.0 abc	3.8 a-d	3.3 a-e	5758.3 d-g	226.3 d-g
Rovral 4 SC	2.0 pt pr/A	H	6.5 abc	89.0 a	3.3 a-f	2.5 c-h	5861.5 c-g	329.5 c-g
Benlate 50 WP	1.0 lb pr/A	B+H	6.3 a-d	56.5 abc	2.3 e-h	2.3 c-h	5943.8 b-f	411.8 b-f
Benlate 50 WP	1.0 lb pr/A	PD+B	6.8 ab	62.0 abc	3.5 a-e	3.5 a-d	5846.3 c-g	314.3 c-g
Benlate 50 WP Triton CS-7 8.33 EC	1.0 lb pr/A 0.25% v/v	B+H B+H	6.3 a-d	75.0 ab	2.5 d-h	2.8 b-g	6052.0 b-e	520.0 b-e
Benlate 50 WP	2.0 lb pr/A	H	6.5 abc	72.5 abc	2.5 d-h	3.0 a-f	5962.0 b-f	430.0 b-f
Benlate 50 WP	1.5 lb pr/A	B	6.8 ab	70.5 abc	2.8 c-h	2.5 c-h	5870.8 b-g	338.8 b-g
Benlate 50 WP	1.5 lb pr/A	H	6.3 a-d	61.5 abc	2.0 f-i	2.5 c-h	5944.0 b-f	412.0 b-f
Benlate 50 WP	1.0 lb pr/A	H	6.3 a-d	66.0 abc	3.0 b-g	3.0 a-f	5973.5 b-f	441.5 b-f
Tilt 3.6 EC	6 oz pr/A	PD+B	6.8 ab	65.5 abc	1.8 ghi	1.3 f-k	5716.7 efg	184.7 efg
Tilt 3.6 EC	10 oz pr/A	B	6.3 a-d	67.0 abc	2.3 e-h	0.8 h-k	6055.5 b-e	523.5 b-e

Continued.

Table 5. Continued.

Treatment	Rate	Timing	Sheath blight Tillers infected (%)	Sheath blight Severity (0-9)	Narrow brown spot (0-9)	Leaf smut (0-9)	Yield (lb/A)	Change from check
Tilt 3.6 EC Benlate 50 WP	10 oz pr/A 1 lb pr/A	B H	6.3 a-d	52.5 bc	1.5 hi	1.3 f-k	6334.5 abc	802.5 abc
Tilt 3.6 EC Rovral 4 SC	10 oz pr/A 1 pt pr/A	B H	6.5 abc	62.0 abc	2.0 f-i	1.3 f-k	6070.0 b-e	538.0 b-e
Folatec 3.8 SC	12 oz pr/A	B+H	6.5 abc	79.5 ab	2.3 e-h	3.3 a-e	5786.4 d-g	254.4 d-g
Topcop 4.2 EC	12 oz pr/A	B+H	6.8 ab	89.0 a	2.3 e-h	3.0 a-f	5437.8 g	-94.3 g
Moncerene 50 WP	0.5 lb pr/A	B+H	5.5 cd	46.5 bc	3.0 b-g	3.3 a-e	6111.3 b-e	579.3 b-e
Moncerene 50 WP	0.5 lb pr/A	PD+B	5.3 d	40.0 cd	3.5 a-e	2.5 c-h	6325.0 abc	793.0 abc
Moncut 50 WP	0.5 lb pr/A	PD+B	7.0 ab	65.0 abc	3.5 a-e	3.8 abc	6113.5 b-e	581.5 b-e
Moncut 50 WP	1.0 lb pr/A	B	6.3 a-d	65.0 abc	3.5 a-e	2.5 c-h	6163.8 b-e	631.8 b-e
Moncut 50 WP	0.7 lb pr/A	PD+B	7.0 ab	51.0 bc	3.0 b-g	2.5 c-h	6368.8 ab	836.8 ab
SN84364 70 WG	0.35 lb pr/A	PD+B	6.3 a-d	48.0 bc	3.5 a-e	2.5 c-h	5840.0 c-g	308.0 c-g
EXP10064B 1.67 SC	0.12 lb ai/A	PD+B	7.3 a	78.5 ab	2.8 c-h	1.5 e-k	5864.0 c-g	332.0 c-g
EXP10064B 1.67 SC	0.18 lb ai/A	PD+B	6.5 abc	77.0 ab	2.8 c-h	0.8 h-k	5915.8 b-g	383.8 b-g
EXP10064B 1.67 SC	0.22 lb ai/A	PD+B	6.3 a-d	51.0 bc	1.8 ghi	1.0 g-k	5894.5 b-g	362.5 b-g
EXP10064B 1.67 SC	0.27 lb ai/A	PD+B	6.8 ab	70.5 abc	2.0 f-i	0.5 ijk	5948.3 b-f	416.3 b-f
EXP10064B 1.67 SC	0.27 lb ai/A	B+H	6.3 a-d	62.5 abc	2.0 f-i	0.0 k	6237.4 a-d	705.4 a-d
EXP10064B 1.67 SC Ortho X-77 8.33 EC	0.22 lb ai/A 0.125% v/v	PD+B PD+B	6.5 abc	54.5 bc	2.3 e-h	0.5 ijk	5993.0 b-f	461.0 b-f
EXP10064B 1.67 SC Rovral 4 SC	0.18 lb ai/A 0.5 pt pr/A	B+H B+H	5.3 d	58.5 abc	0.0 j	0.0 k	6122.0 b-e	590.0 b-e
LSD (.05) =			0.9	26.6	1.1	1.4	403.3	403.3
Standard Dev. =			0.61	19.03	0.78	1.03	288.083	288.079
CV =			9.75	30.28	28.85	46.44	4.82	

Means followed by same letter do not significantly differ (Duncan's MRT, P=.05).
Treatment 2 is standard/comparison treatment.

1991 OFF-STATION FUNGICIDE TRIAL

Location: Errol Lounsberry Farm, Lake Arthur, LA

Soil Type: Crowley silt loam

Variety/Seed Rate: Lemont, 150 lb/A

Planting Method/Date: Water-seeded, Mar 27

Emergence Date: Apr 4

Fertilization: 90-60-60 preplant, Mar 25

Plot Size: 8 x 25 ft

Herbicides: Ordram 23 lb/A, Apr 16; 2 oz/A Londax, Apr 17;
1/2 oz/A Londax, May 3

Insecticides: Furadan 17 lb/A, May 3

Fungicides: Applied at panicle differentiation (PD), early boot (B), and early heading (H)

Application Equipment: CO_2 backpack sprayer, 8002 tips, 10 gal/A

Application Dates: Applied fungicides, June 6, June 14, and June 27

Drained: July 15

Harvest: July 29

Experimental Design: Randomized block with four replications

Disease Ratings: Sheath blight data taken, July 24

Results: See Table 6.

Comments: Sheath blight and leaf smut severity were high. No other disease present.

Table 6. Foliar fungicide performance on sheath blight and leaf smut control. Errol Lounsberry Farm, Lake Arthur, LA. 1991.

Treatment	Rate	Timing	Sheath blight: Infestation % tillers	Sheath blight: Severity (0-9)	Sheath blight: Surface covered (%)	Leaf smut	Yield (lb/A)	Change from check
Unsprayed check			98.5 a	8.0 a	57.5 ab	4.8 a	4470.8 c	---
Benlate 50 WP	1.0 lb pr/A	B+H	70.0 cd	7.0 bcd	35.0 def	3.3 bc	4943.0 ab	472.0 ab
Rovral 4 SC	1.0 pt pr/A	B+H	62.5 de	6.3 de	17.5 gh	3.0 bc	5266.3 a	795.3 a
Tilt 3.6 EC	6 oz pr/A	PD+B	81.0 a-d	7.3 abc	38.8 c-f	0.3 d	4966.5 ab	495. 5 ab
Tilt 3.6 EC	10 oz pr/A	B	77.0 bcd	7.0 bcd	30.0 efg	0.5 d	5280.3 a	809.3 a
Tilt 3.6 EC Benlate 50 WP	10 oz pr/A 1 lb pr/A	B H	65.5 cde	6.8 cd	27.5 fg	1.0 d	5176.5 ab	705.5 ab
Folatec 3.8 SC	12% v/v	B+H	96.0 ab	7.8 ab	48.8 bcd	4.0 ab	4958.0 ab	487.0 ab
Benlate 50 WP	1.5 lb pr/A	B	92.0 ab	8.0 a	51.3 abc	4.3 ab	4772.0 bc	301.0 bc
Tilt 3.6 EC	6 oz pr/A	PD	95.5 ab	7.8 ab	63.8 a	3.8 ab	4792.5 abc	321.5 abc
Rovral 4 SC Benlate 50 WP	1.0 pt pr/A 1.0 lb pr/A	B H	86.0 abc	7.3 abc	42.5 cde	2.3 c	4854.0 abc	383.0 abc
Moncut 50 WP	0.5 lb pr/A	PD+B	85.0 abc	7.5 abc	38.8 c-f	3.3 bc	5002.0 ab	531.0 ab
Monceren 50 WP	0.33 lb pr/A	B+H	46.5 e	5.8 e	5.0 h	4.0 ab	4992.3 ab	521.3 ab
LSD (.05) =			18.4	0.8	13.1	1.1	419.5	419.5
Standard Dev. =			12.71	0.55	9.06	0.77	290.53	290.53
CV =			15.97	7.67	23.85	27.06	5.86	

Means followed by same letter do not significantly differ (Duncan's MRT, P = .05).

FUNGICIDAL CONTROL OF RICE FOLIAR AND STEM DISEASES[1]

M.C. Rush, D.E. Groth, and E.A. Higgins

INTRODUCTION

Field testing of foliar applications of fungicides for the control of disease caused by fungi was initiated in 1972. Theoretically, the fungal diseases occurring on rice in Louisiana can be controlled by foliar applications of fungicides. The diseases which are economically significant include blast (*Pyricularia oryzae*), brown spot (*Bipolaris oryzae*), narrow brown leaf spot (*Cercospora oryzae*), and leaf smut (*Entyloma oryzae*). These diseases are endemic in the Louisiana rice area becoming epidemic periodically. Certain of our presently grown commercial varieties are very susceptible to these diseases. Ultimately, control of these diseases will be by an integrated disease management system using a combination of pesticides, disease resistance, cultural practices, biological control, and legislative-regulatory procedures. It is important that effective fungicides are found, developed, and made available to Louisiana rice growers for use in disease management programs.

MATERIALS AND METHODS

A test was conducted at the Rice Research Station, Crowley, LA, during the 1991 season to screen fungicides for their efficacy in controlling foliar and stem diseases on Lemont rice. The tests were conducted on Crowley silt loam soil with a pH of 6.0. Plots were 20-ft, 7-row, drill strips with 7-inch row spacing and 14-inch alleys. Each treatment was replicated five times using a randomized complete block design. The plots in this test were inoculated with *Rhizoctonia solani* as previously described (2) and infections by the target fungi were from this inoculation or from natural sources of inoculum. Six hundred lb/A of 20-10-10 fertilizer was applied by a drill application to the test area at planting. Plots were planted April 24, 1991, and 4 lb/A of propanil was applied over the test area before applying the permanent flood. Fungicide applications were made at the green ring (June 10), 3rd green ring (June 18), green ring + 14 days (June 24), early boot (June 26), and heading (July 12) stages of growth. Fungicides were applied in 20 gal/A of water with a backpack type CO_2 sprayer. The treatments were as indicated in Table 1.

Plots were rated for disease incidence several days before harvest. Rating systems for the foliar diseases (1) were previously reported. The plots were harvested with a small-plot combine on August 21, 1991. Rough rice weights were corrected to 12% moisture.

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[1] Mention of trade names of the fungicides or other chemicals described in this report are for identification purposes only and does not imply endorsement by Louisiana State University Agricultural Center.

RESULTS AND DISCUSSION

Disease Intensity:

Early rains gave conditions favorable for sheath blight and rice blast infections. Blast infection was so severe that the blast foliar spray test on M-201 rice was not rated or harvested (the test was destroyed before fungicide applications started). Lemont rice with partial resistance to blast had heavy infection and was rated for rotten-neck and panicle blast. Dry weather in mid-season slowed sheath blight development. Rains near harvest caused sheath blight development over the flag leaves. Yield data was confused by heavy blast infection in the uninoculated, unsprayed plots and some fungicide treatments. Due to the high rainfall, leaf scald (*Gerlachia oryzae*) was severe in 1991 and was rated for chemical control. Only a trace of brown spot disease was present and the disease was not rated in 1991.

Effects on Yield and Disease Severity:

Fifty-four fungicide treatments and combinations, an uninoculated, unsprayed control, and an inoculated (*R. solani*) unsprayed control were used in the test. Fifteen of 54 fungicide treatments gave significant yield increases (Table 1). Increases in yield of the significant treatments over the inoculated control ranged from 818 to 1732 lb/A. The Benlate 50WP treatment at boot and heading at the 1.5 lb/A rate produced the 1732 lb/A yield increase (Table 1). This treatment controlled sheath blight, blast, leaf smut, and leaf scald (Tables 1 and 2). All of the Benlate 50WP boot and heading treatments gave significant yield increases ranging from 921 to 1732 lb/A. The Tilt 3.6EC at boot followed by Benlate 50WP at heading, the LS 86263 1.67 SC + Rovral 4SC at boot and heading, Rovral 4SC at boot followed by Benlate 50WP at heading, and LS 86263 1.67 SC + Ortho X77 at boot and heading all gave yield increases greater than 1000 lb/A (Table 1). The uninoculated control and 19 of 54 fungicide treatments significantly reduced the number of tillers with sheath blight at maturity (Table 1). A significant reduction in the sheath blight disease rating was given by the Mon-24017 50WP, Benlate 50WP, Tilt 3.6EC, Moncut 50WP, Monceren 50WP, San 619 100SL, LS 86263 1.67 SC, Rovral 4SC, and Expt. 29B-2 + Rovral 4SC treatments.

The Benlate 50WP boot and heading treatments all gave significant control of rotten-neck and panicle blast (Table 2). These treatments also gave control of leaf smut, leaf scald, and narrow brown spot. San 619 100SL gave significant control of blast, leaf smut, and narrow brown spot with boot and heading applications (Table 2). LS 86263 1.67SC gave control of panicle blast, but not rotten-neck blast. This compound also controlled leaf smut and narrow brown spot. The Expt. 29B-2 + Rovral 4SC treatment at the high rate of the experimental compound controlled panicle blast, leaf smut and narrow brown spot.

Several of the fungicidal compounds tested gave multiple disease control. Most outstanding in this regard were the higher rates of Benlate 50WP. Although this compound has been registered the longest (1976) of any of the commercially available compounds on rice; it still performs well, especially at the 1.5 lb/A rate at boot and heading. Tilt 3.6EC performed best with a 10 fl. oz. application at heading followed by Benlate 50WP. Rovral 4SC at boot followed by Benlate 50WP at heading was also an excellent treatment. Rovral 4SC performed best when applied late in the season with an application at the 3rd green ring stage and one at heading in this test. Folatec 3.8F did not perform well in this test.

LITERATURE CITED

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2. Rush, M.C., D.E. Groth, and E. Higgins. 1990. Fungicidal control of rice foliar and stem diseases. Ann. Prog. Rept., Rice Res. Sta., LA Agr. Expt. Sta., LSU Agricultural Center 82:367-378.

Table 1. Effects of foliar fungicides on sheath blight control and yield in 1991. Rice Research Station; Crowley, LA.

Treatment	Rate (lb or pt/A formulated)	Timing[a/]	Yield (lb/A)	Change from unsprayed (lb/A)	Mean[b/] % tillers infected at maturity	Mean[b/] % tillers dead at maturity	Mean[b/] disease rating at maturity (0-9)
Unsprayed - uninoculated check	---	---	5193	-199	27.4**	11.0	3.8*
Unsprayed - inoculated check	---	---	5392	--	46.2	24.0	5.8
Mon-24017 50WP	0.188 lb	GR	5347	-45	41.2	22.5	5.8
Mon-24017 50WP	0.25 lb	GR	4695	-697	34.6	16.5	5.2
Mon-24017 50WP	0.375 lb	GR	5251	-141	33.0*	13.0	4.8
Mon-24017 50WP	0.5 lb	GR	5608	216	37.6	10.5	4.8
Mon-24017 50WP	0.125 lb	GR+14 Days	5375	-17	27.6**	9.5	4.2*
Mon-24017 50WP	0.5 lb	GR+14 Days	5469	77	22.0**	2.5*	3.4**
Mon-24017 50WP	0.375 lb	GR+7 Days	5313	-79	24.4**	1.5*	3.4**
Mon-24017 50WP	0.5 lb	GR+7 Days	5283	-109	27.2**	0.2**	2.8**
Dithane F-45 4FI	4 pt.	GR	5542	150	43.4	20.2	5.0
Benlate 50WP	l lb	GR	5689	297	35.2	11.5	5.0
Benlate 50WP	l lb	B + H	6313*	921	32.0*	9.5	4.2*
Benlate 50WP	1.25 lb	B + H	6712**	1320	37.8	8.2	4.0*
Benlate 50WP	1.50 lb	B + H	7124**	1732	25.6**	3.0*	3.6**

Continued

Table 1. (Cont'd)

Treatment	Rate (lb or pt/A formulated)	Timing[a/]	Yield (lb/A)	Change from unsprayed (lb/A)	Mean[b/] % tillers infected at maturity	Mean[b/] % tillers dead at maturity	Mean[b/] disease rating at maturity (0-9)
Tilt 3.6EC	0.375 pt.	GR + B	5276	-116	53.4	40.0	7.0
Tilt 3.6EC	0.625 pt.	B	5605	213	40.2	4.2*	4.2*
Tilt 3.6EC + Benlate 50WP	0.625 pt. 1 lb	B H	6497**	1105	38.8	8.0	4.4
Tilt 3.6EC	0.375 pt	GR	5311	-81	47.6	5.0*	4.2*
Tilt 3.6EC	0.375 pt.	3rd GR + B	5562	170	46.6	10.5	5.2
Tilt 3.6EC	0.625 pt.	GR	5189	-203	36.6	26.0	5.4
Tilt 3.6EC	0.625 pt.	GR + B	5961	569	42.8	21.2	5.0
Tilt 3.6EC	0.625 pt.	3rd GR + B	5931	539	36.8	9.7	4.4
Tilt 3.6EC + Rovral 4SC	0.625 pt. 1 pt.	B H	5993	601	29.6*	4.5*	4.4
Moncut 50WP	1 lb	GR	5288	-104	42.4	8.0	4.2*
Moncut 50WP	0.5 lb	GR + B	5603	211	37.2	18.5	5.0
Moncut 50WP	1 lb	B	5638	246	35.0	21.5	5.4
Moncut 50WP	0.7 lb	GR + B	5641	249	30.4*	13.0	5.0
Moncut 50WP	0.5 lb	B + H	5753	361	29.4**	0.0**	3.0**

Continued

Table 1. (Cont'd)

Treatment	Rate (lb or pt/A formulated)	Timing[a]	Yield (lb/A)	Change from unsprayed (lb/A)	Mean[b] % tillers infected at maturity	Mean[b] % tillers dead at maturity	Mean[b] disease rating at maturity (0-9)
Moncut 50WP	0.5 lb	B	5755	363	42.4	19.5	5.0
SN84364 70WG	0.36 lb	GR + B	5208	-184	40.0	18.5	5.0
SN84364 70WG	0.5 lb	GR + B	5453	61	43.2	19.0	5.4
Monceren 50WP	0.5 lb	GR	5163	-229	46.6	16.5	5.0
Monceren 50WP	0.5 lb	GR + B	6210*	818	31.0*	11.5	4.6
Monceren 50WP	0.5 lb	B + H	6276*	884	24.2**	1.5*	2.4**
San 619 100SL	1 pt.	GR	5721	329	40.0	15.5	5.2
San 619 100SL	1 pt.	GR + B	6039	647	26.8**	4.0*	3.6**
San 619 100SL	1 pt.	B + H	6055	663	24.8**	0.0**	2.4**
LS 86263 1.67SC	0.12 lb ai/A	GR + B	6217*	825	35.6	13.2	4.6
LS 86263 1.67SC	0.18 lb ai/A	GR + B	6291*	899	38.8	18.0	5.2
LS 86263 1.67SC	0.22 lb ai/A	GR + B	6210*	818	35.0	15.5	4.8
LS 86263 1.67SC	0.27 lb ai/A	GR + B	5997	605	36.0	12.0	4.6
LS 86263 1.67SC	0.27 lb ai/A	B + H	6251*	859	30.8*	3.5*	3.0**
LS 86263 1.67SC + Rovral 4SC	0.18 lb ai/A 0.5 lb ai/A	B + H B + H	6301*	909	33.6	2.0*	3.0**

Continued

Table 1. (Cont'd)

Treatment	Rate (lb or pt/A formulated)	Timing[a/]	Yield (lb/A)	Change from unsprayed (lb/A)	Mean[b/] % tillers infected at maturity	Mean[b/] % tillers dead at maturity	Mean[b/] disease rating at maturity (0-9)
LS 86263 1.67SC	0.18 lb ai/A	B + H	6426**	1034	29.0**	3.0*	3.4**
+ Rovral 4SC	0.25 lb ai/A	B + H					
Rovral 4SC	1 pt.	B	6441**	1049	37.6	9.0	4.6
+ Benlate 50WP	1 lb	H					
LS 86263 1.67SC	0.22 lb ai/A	GR + B	5988	596	38.6	24.5	5.2
+ Ortho X-77	.125% v/v	GR + B					
LS 86263 1.67SC	0.22 lb ai/A	B + H	6438**	1046	32.6*	9.0	3.6**
+ Ortho X-77	.125% v/v	B + H					
LS 86263 1.67SC	0.36 lb ai/A	B	6020	628	41.4	21.5	5.4
Rovral 4SC	1 pt.	GR	5449	57	50.0	32.0	6.2
Rovral 4SC	1 pt.	GR + B	5467	75	41.4	24.5	5.8
Rovral 4SC	1 pt.	3rd GR + H	5797	405	33.2*	4.5*	3.4**
Folatec 3.8F	0.75 pt.	B + H	5949	557	43.0	8.0	4.6
Expt. 29B-2	2 pt.	B + H	5115	-277	34.0	4.2*	3.8*
+ Rovral 4SC	0.66 pt.	B + H					
Expt. 29B-2	3 pt.	B + H	5961	569	36.4	10.5	4.6
+ Rovral 4SC	0.5 pt.	B + H					
Mon-24017 50WP	0.188 lb	GR+14 Days	5326	-66	27.6**	5.5*	4.0*

Continued

Table 1. (Cont'd)

Treatment	Rate (lb or pt/A formulated)	Timing[a]	Yield (lb/A)	Change from unsprayed (lb/A)	Mean[b] % tillers infected at maturity	Mean[b] % tillers dead at maturity	Mean[b] disease rating at maturity (0-9)
LSD 0.01			964		16.8	22.6	2.1
LSD 0.05			734		12.8	17.2	1.6

[a] GR = green-ring stage of growth (first internode elongating), B = boot stage (1-2 inch panicles), H = heading stage (80-90% of panicles emerging).

[b] Means marked with asterisks were significantly different at the 0.01 (**) or 0.05 (*) probability levels.

Table 2. **Effects of foliar fungicides on control of leaf smut, leaf scald, narrow brown spot, rotten-neck blast, and panicle blast in 1991. Rice Research Station; Crowley, LA.**

Treatment	Rate (lb or pt/A formulated)	Timing[a/]	Mean[b/] Panicle Blast (%)	Mean[b/] Rotten-neck Blast (%)	Mean[b/] disease rating leaf smut (0-9)	Mean[b/] disease rating leaf scald (0-9)	Mean[b/] disease rating narrow brown spot (0-9)
Unsprayed - uninoculated check	---	---	25.0	38.0	4.8	5.6	3.2
Unsprayed - inoculated check	---	---	26.8	30.4	5.8	4.6	2.8
Mon-24017 50WP	0.188 lb	GR	24.4	35.8	5.4	4.8	2.8
Mon-24017 50WP	0.25 lb	GR	29.4	39.2	6.2	4.4	3.4
Mon-24017 50WP	0.375 lb	GR	22.0	35.4	5.8	4.8	2.2
Mon-24017 50WP	0.5 lb	GR	23.6	36.6	4.4	5.0	1.4
Mon-24017 50WP	0.125 lb	GR+14 Days	25.4	32.0	4.4	5.2	2.0
Mon-24017 50WP	0.5 lb	GR+14 Days	20.8	35.0	1.8**	5.2	2.8
Mon-24017 50WP	0.375 lb	GR+7 Days	25.0	34.0	3.0**	4.6	2.6
Mon-24017 50WP	0.5 lb	GR+7 Days	25.6	42.0	2.6**	4.6	2.6
Dithane F-45 4Fl	4 pt.	GR	22.2	31.0	5.2	4.8	3.0
Benlate 50WP	I lb	GR	28.2	35.8	4.4	3.2	2.6
Benlate 50WP	I lb	B + H	12.8**	18.2*	3.2**	3.6	1.0*
Benlate 50WP	1.25 lb	B + H	13.4**	17.6*	3.4**	4.2	1.4

Continued

Table 2. (Cont'd)

Treatment	Rate (lb or pt/A formulated)	Timing[a/]	Mean[b/] Panicle Blast (%)	Mean[b/] Rotten-neck Blast (%)	Mean[b/] disease rating leaf smut (0-9)	Mean[b/] disease rating leaf scald (0-9)	Mean[b/] disease rating narrow brown spot (0-9)
Benlate 50WP	1.50 lb	B + H	12.6**	16.0*	3.4**	2.8*	2.0
Tilt 3.6EC	0.375 pt.	GR + B	22.4	32.4	0.6**	3.6	1.8
Tilt 3.6EC	0.625 pt.	B	23.0	33.0	0.4**	4.0	0.8**
Tilt 3.6EC + Benlate 50WP	0.625 pt. 1 lb	B H	17.0*	24.4	0.4**	3.8	0.4**
Tilt 3.6EC	0.375 pt	GR	26.0	35.2	5.4	4.0	2.0
Tilt 3.6EC	0.375 pt.	3rd GR + B	25.6	33.8	0.8**	2.6*	1.6
Tilt 3.6EC	0.625 pt.	GR	21.6	35.6	3.8*	4.4	1.6
Tilt 3.6EC	0.625 pt.	GR + B	22.4	29.4	0.2**	2.8*	1.0*
Tilt 3.6EC	0.625 pt.	3rd GR + B	22.4	28.4	0.2**	3.2	1.0*
Tilt 3.6EC + Rovral 4SC	0.625 pt. 1 pt.	B H	16.2*	29.0	0.2**	4.8	0.4**
Moncut 50WP	1 lb	GR	28.8	37.4	5.4	4.8	2.8
Moncut 50WP	0.5 lb	GR + B	25.2	36.8	4.4	5.0	2.8
Moncut 50WP	1 lb	B	20.6	32.4	4.8	4.4	2.6
Moncut 50WP	0.7 lb	GR + B	20.8	33.2	5.4	5.2	4.0

Continued

Table 2. (Cont'd)

Treatment	Rate (lb or pt/A formulated)	Timing[a]	Mean[b] Panicle Blast (%)	Mean[b] Rotten-neck Blast (%)	Mean[b] disease rating leaf smut (0-9)	Mean[b] disease rating leaf scald (0-9)	Mean[b] disease rating narrow brown spot (0-9)
Moncut 50WP	0.5 lb	B + H	23.6	29.0	4.6	4.6	3.0
Moncut 50WP	0.5 lb	B	18.2*	23.0	5.0	5.8	2.8
SN84364 70WG	0.36 lb	GR + B	27.8	37.0	5.4	4.8	2.6
SN84364 70WG	0.5 lb	GR + B	21.2	25.0	5.8	5.0	3.2
Monceren 50WP	0.5 lb	GR	21.0	30.8	6.2	4.6	2.2
Monceren 50WP	0.5 lb	GR + B	20.0	30.6	4.6	5.8	3.0
Monceren 50WP	0.5 lb	B + H	16.4*	22.6	6.0	6.0	3.4
San 619 100SL	1 pt.	GR	24.8	32.4	4.8	4.4	2.6
San 619 100SL	1 pt.	GR + B	24.0	34.8	1.0**	5.0	3.0
San 619 100SL	1 pt.	B + H	18.6*	26.2	0.0**	3.4	0.2**
LS 86263 1.67SC	0.12 lb ai/A	GR + B	17.2*	22.8	1.6**	5.4	1.0*
LS 86263 1.67SC	0.18 lb ai/A	GR + B	16.8*	20.8	1.0**	6.0	1.8
LS 86263 1.67SC	0.22 lb ai/A	GR + B	17.2*	25.4	0.4**	4.0	1.0*
LS 86263 1.67SC	0.27 lb ai/A	GR + B	21.0	22.2	0.6**	4.0	1.4
LS 86263 1.67SC	0.27 lb ai/A	B + H	20.8	30.6	0.0**	2.4*	0.2**

Continued

Table 2. (Cont'd)

Treatment	Rate (lb or pt/A formulated)	Timing[a]	Mean[b] Panicle Blast (%)	Mean[b] Rotten-neck Blast (%)	Mean[b] disease rating leaf smut (0-9)	Mean[b] disease rating leaf scald (0-9)	Mean[b] disease rating narrow brown spot (0-9)
LS 86263 1.67SC + Rovral 4SC	0.18 lb ai/A 0.5 lb ai/A	B + H B + H	17.2*	23.0	0.8**	4.8	0.4**
LS 86263 1.67SC + Rovral 4SC	0.18 lb ai/A 0.25 lb ai/A	B + H B + H	21.6	26.6	0.0**	5.4	0.0**
Rovral 4SC + Benlate 50WP	1 pt. 1 lb	B H	21.4	28.4	4.8	3.2	1.4
LS 86263 1.67SC + Ortho X-77	0.22 lb ai/A .125% v/v	GR + B GR + B	17.4*	22.2	0.8**	4.0	2.4
LS 86263 1.67SC + Ortho X-77	0.22 lb ai/A .125% v/v	B + H B + H	14.0**	16.2*	0.0**	5.0	0.0**
LS 86263 1.67SC	0.36 lb ai/A	B	18.4*	25.6	0.2**	4.6	1.2*
Rovral 4SC	1 pt.	GR	25.0	32.4	6.4	5.2	2.8
Rovral 4SC	1 pt.	GR + B	24.2	37.2	5.6	5.2	2.8
Rovral 4SC	1 pt.	3rd GR + H	24.2	32.2	5.0	4.6	3.6
Folatec 3.8F	0.75 pt.	B + H	24.2	28.8	5.2	4.2	1.8
Expt. 29B-2 + Rovral 4SC	2 pt. 0.66 pt.	B + H B + H	27.8	37.8	1.0**	3.2	0.6**

Continued

Table 2. (Cont'd)

Treatment	Rate (lb or pt/A formulated)	Timing[a]	Mean[b] Panicle Blast (%)	Mean[b] Rotten-neck Blast (%)	Mean[b] disease rating leaf smut (0-9)	Mean[b] disease rating leaf scald (0-9)	Mean[b] disease rating narrow brown spot (0-9)
Expt. 29B-2 + Rovral 4SC	3 pt. 0.5 pt.	B + H B + H	15.0**	23.0	1.0**	4.2	0.4**
Mon-24017 50WP	0.188 lb	GR + 14 Days	26.4	37.0	4.8	5.0	2.0
LSD 0.01			10.7	15.7	2.2	2.4	2.0
LSD 0.05			8.2	11.9	1.7	1.8	1.5

[a] GR = green-ring stage of growth (first internode elongating), B = boot stage (1-2 inch panicles), H = heading stage (80-90% of panicles emerging).

[b] Means marked with asterisks were significantly different at the 0.01 (**) or 0.05 (*) probability levels.

CHEMICAL CONTROL OF RICE SEEDLING DISEASES[1]

M.C. Rush and Elizabeth Higgins

INTRODUCTION

Seed-rot and damping off diseases are common in the Southern rice area causing stand reduction and irregularities in water-planted and, to a lesser extent, drill-planted rice. Losses are incurred directly through the costs of replanting and indirectly through the inefficient use of space and light in irregular stands, and by increased competition with weeds. Rice seed germination and growth of seedlings is often poor under the weather conditions normally encountered in March and early April in the Southern rice area. Considerable damage to water-planted seed is encountered under these cool weather conditions regardless of the seed-treatment fungicides used. The fungi causing seed rotting and water-mold in water-seeded rice included species of *Achlya, Pythium,* and *Fusarium*. Drill-seeded rice can be injured by several seedborne fungi included *Helminthosporium oryzae, Curvularia lunata, Fusarium roseum,* and *Fusarium moniliforme*. Soilborne pathogens like *Rhizoctonia solani, Sclerotium rolfsii,* and *Pythium* spp. can also cause seedling blight.

Theoretically, seed and seedling diseases of rice can be economically controlled by seed-treatment fungicides. For this reason, a program to develop more effective fungicidal seed treatments has been conducted at the LSU Rice Research Station since the early 1970's. Fungicides or formulation of fungicides are field screened in experimental tests each year. Those formulations performing well in the experimental tests are advanced to further field testing in subsequent years.

MATERIALS AND METHODS

A single lot of Lemont rice seed was treated in the second and third weeks of March 1991 with fungicides at the rates listed in Table 1. The formulated fungicides were placed into water (2 ml/0.25 lb seed) in glass jars, stirred with a magnetic stir bar until in suspension, and the suspended material was used to coat the inside of each jar. Weighed seed samples were poured into the jar and the jar was placed onto a jar mill to revolve for 10 minutes. Treated seed were stored in heavy manila seed envelopes until planted.

Simulated water- and drill-seeded methods were used to plant treated seed at the Rice Research station, Crowley, LA. Water-seeded tests consisted of 23

[1] Mention of trade names of the seed protectant fungicides described in this paper is for identification purposes only and does not imply endorsement by the Louisiana Agricultural Experiment Station, Louisiana State University Agriculture Center.

treatments with five replications of 200 seeds per plot. Seeds were soaked in five volumes of tap water for 24 to 30 hours before planting except in the case of treatments 18 through 23 which were non-presprouted. Plots consisted of cylinders 1-ft high and 2-ft in diameter made of 1/8-inch mesh hardware cloth. After planting, each cylinder was covered with 1/2-inch mesh hardware cloth to keep out birds and rats. The cylinders were arranged in a completely randomized block design, 2-ft apart within blocks, with a 6-ft alley between blocks. The treated seeds were planted in 4 to 5 inches of water.

Two individually leveed plot areas were planted at each planting date using identical procedures. In one plot area, the water was removed after 3 days and the plots were flushed as needed. In the other plot area, the flood was maintained at 2 to 4 inches until 3 days before the stands were counted.

Drill-planted plots consisted of 17 treatments planted in single 10-ft rows with 350 seeds per row in an individually leveed area. Plots were replicated five times in a randomized complete block design in each test. Rows were spaced 10-inches apart within blocks with 6-ft alleys between blocks. Seeds were planted with a drop-seeder.

RESULTS AND DISCUSSION

A total of 23 fungicides, combinations, untreated seeds, and presprouting combinations were originated in our laboratory or the laboratory of Dr. Glen Whitney (Texas A & M University) and used in planting a seed-treatment fungicide test for rice at the LSU Rice Research Station. Seeds with the different treatments were planted using three water management systems; drill-seeded; water-seeded, drained and flushed (WSDF) and water-seeded with a continuous flood (WSCF). Drill-seeded treatments were not presprouted.

Treatments giving significant stand increases in the WSDF treatments included Dithane 75DF, Gus 338 + Vitavax 200, and Champ SD nonpresprouted. The best treatment increased stand over the stand from untreated seed by 12.6% (Table 2).

Among the WSCF treatments Dithane 75DF, Vitavax 200, Thiram 42S, Champ SD, Champion SD, WECO 389 + Apron TL, Nusan 30 + Vitavax 200, and Champ SD nonpresprouted. The Champ SD nonpresprouted treatment increased stand 18% over that produced by untreated seeds and 6% over the presprouted Champ SD treated seeds.

Among the drill-seeded treatments the Dithane 75DF, Vitavax 200, Thiram 42S, Champ SD, Champion SD, and the Nusan 30 + Vitavax 200 treatments significantly increased stand over that produced by untreated seeds. The GUS 338 + Vitavax 200 treatment was phytotoxic under drill-seeded conditions and significantly decreased stand (Table 2).

Presprouting seeds in the WSCF treatments significantly increased stand over planting dry seeds with the Dithane 75DF treatment. Presprouting did not give a significant stand difference with the other treatments (Table 2). In general not presprouting seeds had little effect on the stands produced by fungicide treated or untreated seeds.

Weather conditions in 1991 favored seed germination and seedling growth. Seedling disease was moderate to low.

Table 1. Experimental chemicals used in the 1991 experimental seed-protectant fungicide tests at the Rice Research Station, Crowley, LA.

TRT #	TREATMENT	RATE (FORMULATED)	COMPANY
1*	Untreated Seeds - Control	---	
2*	Dithane DF 75%	4.3 oz.	Rohm & Haas
3*	Benlate DF	4.0 oz.	DuPont
4*	Thiram 42S + GUS PP 17	3.3 oz. 0.4 oz.	Gustafson
5*	Apron-TBZ	0.16 oz.	Gustafson
6*	Vitavax 200	4.0 oz.	Gustafson
7*	Thiram 42S	3.3 oz.	Gustafson
8*	ART	0.2 oz.	Gustafson
9*	LOV 80240A	91.0 ml.	Loveland
10*	CHAMP SD	6.0 oz.	Agtrol
11*	CHAMPION SD	6.0 oz.	Agtrol
12*	CGA 173506	6.8 g.	Ciba-Geigy
13*	WECO 389	5.0 oz.	Wilber-Ellis
14*	WECO 389 + Apron TL	5.0 oz. 2.0 oz.	Wilber-Ellis
15*	Nusan 30	1.25 oz.	Wilber-Ellis
16*	Nusan 30 + Vitavax 200	1.0 oz. 2.0 oz.	Wilber-Ellis
17	GUS 338 + Vitavax 200	4.3 oz. 4.0 oz.	Gustafson

* Regional Cooperative Test

Table 2. Effect of seed-protectant fungicides on stand in water-seeded, drained and flushed rice (WSDF); in water-seeded, continuous flood rice (WSCF); and in drill-seeded rice (DS). Rice Research Station, Crowley, LA. 1991.

Treatment	Rate (oz or fl oz/cwt formulated)	Mean[a/] WSDF Stand	WSDF Stand (%)	Mean[b/] WSCF Stand	WSCF Stand (%)	Mean[c/] DS Stand	DS Stand (%)
Untreated Control	---	150.3	75.2	120.2	60.1	247.5	70.7
Dithane DF 75%	4.3 oz.	163.5*	81.8	139.7**	69.9	279.8**	79.9
Benlate DF	4.0 oz.	145.2	72.6	124.7	62.4	240.8	68.8
Thiram 42S + GUS PP 17	3.3 oz. 0.4 oz.	155.5	77.8	130.3	65.2	255.0	72.9
Apron-TBZ	0.16 oz.	159.8	79.9	131.2	65.6	260.0	74.3
Vitavax 200	4.0 oz.	159.7	79.9	139.8**	69.9	265.5*	75.9
Thiram 42S	3.3 oz.	151.8	75.9	136.8**	68.4	271.0**	77.4
ART	0.2 oz.	143.2	71.6	128.5	64.3	260.8	74.5
LOV 80240A	91.0 ml.	146.5	73.3	117.2	58.6	246.8	70.5
CHAMP SD	6.0 oz.	160.0	80.0	134.3*	67.2	284.0**	81.1
CHAMPION SD	6.0 oz.	161.8	80.9	137.8**	68.9	277.3**	79.2
CGA 173506	6.8 g.	154.5	77.3	128.7	64.4	237.7	67.9
WECO 389	5.0 oz.	153.2	76.6	122.8	61.4	255.5	73.0
WECO 389 + Apron TL	5.0 oz. 2.0 oz.	161.3	80.7	135.8*	67.9	262.0	74.9

Continued

Table 2. (Cont'd)

Treatment	Rate (oz or fl oz/cwt formulated)	Mean[a/] WSDF Stand	WSDF Stand (%)	Mean[b/] WSCF Stand	WSCF Stand (%)	Mean[c/] DS Stand	DS Stand (%)
Nusan 30	1.25 oz.	145.0	72.5	126.5	63.3	262.2	74.9
Nusan 30 + Vitavax 200	1.0 oz. 2.0 oz.	161.3	80.7	135.3*	67.7	274.0**	78.3
GUS 338 + Vitavax 200	4.3 oz. 4.0 oz.	169.0**	84.5	132.0	66.0	221.3-(**)	63.2
Untreated Control - Non Pre-Sprouted	---	148.7	74.4	126.7	63.4	---	---
Dithane DF 75% - Non Pre-Sprouted	4.3 oz.	158.5	79.3	123.7	61.9	---	---
Vitavax 200 - Non Pre-Sprouted	4.0 oz.	156.3	78.2	128.2	64.1	---	---
Thiram 42S - Non Pre-Sprouted	3.3 oz.	160.5	80.3	122.8	61.4	---	---
CHAMP SD - Non Pre-Sprouted	6.0 oz.	163.7*	81.9	142.2**	71.1	---	---
Nusan 30 - Non Pre-Sprouted	1.25 oz.	154.0	77.0	123.3	61.7	---	---

Continued

Table 2. (Cont'd)

Treatment	Rate (oz or fl oz/cwt formulated)	Mean[a] WSDF Stand	WSDF Stand (%)	Mean[b] WSCF Stand	WSCF Stand (%)	Mean[c] DS Stand	DS Stand (%)
LSD 0.01		15.9		16.8		21.7	
LSD 0.05		12.0		12.7		16.3	

[a] WSDF = Water-seeded on April 11, 1991, drained in 3 days, and flushed as needed; 200 seeds per plot; Stand counts on May 7, 1991; Means marked with asterisks were significantly different at the 0.01 (**) or 0.05 (*) probability levels.

[b] WSCF = Water-seeded on April 11, 1991, continuous flood; 200 seeds per plot; Stand counts on May 9, 1991; Means marked with asterisks were significantly different at the 0.01 (**) or 0.05 (*) probability levels.

[c] DS = Drill-seeded on April 10, 1991; 350 seeds per plot; Stnad counts on May 7, 1991; Means marked with asterisks were significantly different at the 0.01 (**) or 0.05 (*) probability levels.

WHEAT DISEASE CONTROL STUDIES

1991 WHEAT FUNGICIDE TRIAL

Location: Rice Research Station, Crowley, LA

Soil Type: Crowley silt loam

Variety/Seed Rate: FL 302 and McNair 1003, 90 lb/A

Planting Method/Date: Drill seeded, Nov 2

Emergence Date: Nov 11

Fertilization: Preplant 30-91-91, Nov 2; topdressed 80-0-0, Feb 2

Plot Size: 4 x 20 ft

Herbicides: None

Insecticides: None

Fungicides: Applied at stages 8, 10, and 10.5 (Feeke's scale)

Application Equipment: CO_2 backpack sprayer, 8002 tips, 10 gal/A

Application Dates: Applied fungicides, Mar 13, Mar 15, and Apr 3

Harvest: May 5

Experimental Design: Randomized block design with four replications

Disease Ratings: May 1

Results: See Tables 1 and 2.

Comments: Leaf rust and septoria leaf and glume blotch were severe.

Table 1. Foliar fungicide control of leaf rust on the wheat variety McNair 1003. Rice Research Station, Crowley, LA. 1991.

Treatment	Rate	Growth stage	% Leaf rust	Yield (lb/A)
Untreated check			30.8 a	2117.5c
Folicur 3.6 SC	1.8 oz ai/A	9	13.3 b	2637.8 ab
CS-7 8.33 EC	.25% v/v	9		
Folicur 3.6 SC	2.7 oz ai/A	9	12.5 bc	2751.5 ab
CS-7 8.33 EC	.25% v/v	9		
Bayleton 50 DF	1 oz ai/A	9	13.3 b	2480.5 abc
Dithane 75 DF	25.6 oz ai/A	9		
CS-7 8.33 EC	.25% v/v	9		
Bayleton 50 DF	1 oz ai/A	9 + 10.5	3.5 cd	2916.0 ab
Dithane 75 DF	25.6 oz ai/A	9 + 10.5		
CS-7 8.33 EC	.25% v/v	9 + 10.5		
Bayleton 50 DF	1.5 oz ai/A	9 + 10.5	2.8 d	2979.3 a
CS-7 8.33 EC	.25% v/v	9 + 10.5		
Bayleton 50 DF	1 oz ai/A	9 + 10.5	5.3 bcd	2921.0 ab
CS-7 8.33 EC	.25% v/v	9 + 10.5		
Benlate 50 DF	2 oz ai/A	9 + 10.5		
Tilt 3.6 EC	1.8 oz ai/A	8	26.3 a	2428.5 bc
Dithane 75 DF	25.6 oz ai/A	9 + 10.5	5.3 bcd	2735.8 ab
CS-7 8.33 EC	.25% v/v	9 + 10.5		
Bayleton 50 DF	2 oz ai/A	9 + 10.5	1.5 d	2710.3 ab
CS-7 8.33 EC	.25% v/v	9 + 10.5		
San 619 0.83 EC	1.04 oz ai/A	9 + 10.5	0.0 d	2754.5 ab
San 619 0.83 EC	1.41 oz ai/A	9 + 10.5	1.3 d	2883.8 ab
LSD (.05) =			8.7	426.9
Standard Dev. =			5.99	295.68
CV =			62.06	10.98

Means followed by same letter do not significantly differ (Duncan's MRT, P = .05).

Table 2. Foliar fungicide control of leaf rust, septoria leaf spot, and scab on the wheat variety Florida 302. Rice Research Station, Crowley, LA. 1991.

Treatment	Rate	Growth stage	% Leaf rust	% Septoria	% Scab	Yield (lb/A)
Untreated check			95.0 a	38.0 a	22.0 ab	945.8 f
Folicur 3.6 SC	1.8 oz ai/A	9	29.3 c	17.5 bcd	20.3 ab	1827.0 bcd
CS-7 8.33 EC	.25% v/v	9				
Folicur 3.6 SC	2.7 oz ai/A	9	22.5 cd	19.3 bcd	19.0 ab	2006.5 abc
CS-7 8.33 EC	.25% v/v	9				
Bayleton 50 DF	1 oz ai/A	9	58.3 b	27.5 abc	20.3 ab	1510.3 de
Dithane 75 DF	25.6 oz ai/A	9				
CS-7 8.33 EC	.25% v/v	9				
Bayleton 50 DF	1 oz ai/A	9 + 10.5	18.8 cd	12.5 cd	21.0 ab	2178.3 ab
Dithane 75 DF	25.6 oz ai/A	9 + 10.5				
CS-7 8.33 EC	.25% v/v	9 + 10.5				
Bayleton 50 DF	1.5 oz ai/A	9 + 10.5	10.8 de	34.5 ab	20.3 ab	1670.3 cde
CS-7 8.33 EC	.25% v/v	9 + 10.5				
Bayleton 50 DF	1 oz ai/A	9 + 10.5	19.5 cd	27.0 abc	19.0 ab	1515.3 de
CS-7 8.33 EC	.25% v/v	9 + 10.5				
Benlate 50 DF	2 oz ai/A	9 + 10.5				
Tilt 3.6 EC	1.8 oz ai/A	8	70.0 b	28.8 abc	17.5 b	1564.5 de
Dithane 75 DF	25.6 oz ai/A	9 + 10.5	70.0 b	25.8 abc	22.5 a	1368.8 e
CS-7 8.33 EC	.25% v/v	9 + 10.5				
Bayleton 50 DF	2 oz ai/A	9 + 10.5	18.0 cd	18.8 bcd	19.5 ab	1940.8 bc
CS-7 8.33 EC	.25% v/v	9 + 10.5				
San 619 0.83 EC	1.05 oz ai/A	9	0.0 e	6.3d	17.5 b	2135.8 ab
San 619 0.83 EC	1.41 oz ai/A	9	1.0 e	2.8 d	17.3 b	2346.3 a
LSD (.05) =			12.4	15.2	4.1	346.8
Standard Dev. =			8.60	10.51	2.82	240.19
CV =			24.99	48.81	14.37	13.72

Means followed by same letter do not significantly differ (Duncan's MRT, P = .05).

ROTATIONAL CROPS RESEARCH[1]

R.J. Habetz

Soybean [Glycine max (L.) Merr.] is a major agronomic crop in southwest Louisiana. The soybean crop is primarily grown as a rotational crop with rice. The acreage of soybeans in the area has been declining, primarily due to market conditions. In 1991, the acreage of soybeans in southwest Louisiana decreased drastically due to wet weather since many producers were prevented from planting their acreage of soybeans.

Grain sorghum [Sorghum bicolor (L.) Moench], is also grown in rotation with rice and as an alternative to soybeans. Acreage was also reduced in 1991 due to weather conditions.

The Rice Research Station participates in statewide soybean and grain sorghum variety tests conducted by the Louisiana Agricultural Experiment Station. However, in 1991, the Rice Research Station was prevented from planting the soybean and grain sroghum variety tests due to persistently unfavorable weather conditions.

A study of soybean production practices was conducted and the results are presented in this section.

Wheat (Triticum aestivum L.) is primarily double cropped with soybeans in southwest Louisiana. The acreage of wheat in 1991 was about the same as in previuos years. However, much of the production was of poor quality, and in some situations, wheat was not harvested due to weather damage.

This project conducted wheat variety tests and a management or production practice study in 1991. Results of this research are also presented in the following section.

A variety test of Kenaf (Hibiscus cannabinus) was conducted in 1991 and the results are presented in the following section. Kenaf is a new fiber crop which may offer an additional alternative source of income to producers in the area.

[1] This research is partially supported by funds provided by the Louisiana Soybean and Grain Research and Promotion Board.

WHEAT VARIETY TEST

R.J. Habetz and S.A. Harrison

Location: Rice Research Station

Soil Type: Crowley silt loam

Seeding Rate: 90 lb/A

Planting Date: Nov. 2, 1990

Fertilizer: 32-96-96 ($N-P_2O_5-K_2O$) broadcast and incorporated prior to planting; 80-0-0 (21%) on Feb. 13. An additional 40-0-0 (21%) on Mar. 12 was added to high management test.

Plot Size: 4 x 25 ft

Harvested: May 14

Experimental Design: Randomized complete block with four replications

Comments: The average yield of all varieties for 1991 was 42.3 bu/A (Table 1). Coker 9323, a Northrup King variety, had the highest yield (65.4 bu/A) followed by a fairly new variety Coker 9105 (64.5 bu/A), Florida 303 (60.9 bu/A), and Traveler (60.3 bu/A).

The high management wheat production tests differed from the conventional test by the application of additional nitrogen and two applications of fungicide. The better performing varieties in the high management study were Coker 9877 (68.5 bu/A) followed by Coker 9105 (67.4 bu/A) and Coker 9766 (65.0 bu/A). Florida 302 is normally a high yielding variety but it showed an unusually excessive amount of leaf rust and Septoria (Table 1) in this test.

In the 3-year analysis FFR 525 W, a Stoneville FFR variety, showed the highest yield (53.2 bu/A) and highest test weight (56.3) but it also had the highest leaf rust rating (Table 2).

Table 1. Performance of entries in the wheat performance trials at the Rice Research Station, Crowley, LA. 1991.

Brand/Entry	Yield[1] C	Yield[1] H	Lodging[2]	Plant height	Leaf rust[3]	Septoria[4]	Bacteria[5]
Northrup King/Coker 9323	65.4	61.6	4	32	1	3.5	2.5
Northrup King/Coker 9105	64.5	67.4	3	40	0	3.0	2.0
Florida 303	60.9	60.4	3	41	0	5.5	5.5
ABI/Traveler	60.3	64.9	1	36	8	4.0	3.0
DS 2360	58.2	52.6	2	41	1	3.0	3.0
Terral 877	58.2	56.6	2	42	3	3.5	3.0
Northrup King/Coker 9877	57.5	68.5	2	41	0	2.5	2.5
Northrup King/Coker 9766	57.5	65.0	3	36	0	3.0	4.5
Florida 302	56.0	56.3	2	44	13	4.5	2.0
ABI/Savannah	54.8	59.1	1	39	0	2.5	2.5
Bayles	54.7	64.7	1	34	0	4.5	2.5
FFR 525 W	51.9	60.5	1	42	15	3.0	3.0
Terral 812	51.9	49.7	1	41	1	4.5	2.5
Andy	51.2	52.1	1	35	0	7.0	3.0
Northrup King/Coker 9227	45.6	52.0	2	36	0	2.5	2.5
ATW 270	44.3	57.3	1	35	1	6.5	3.0
Terral 101	38.1	29.1	4	37	1	2.0	1.0
FFR 568 W	36.3	54.6	4	40	28	3.0	3.0
GA 100	15.8	40.1	5	38	30	3.0	2.0
Gore	11.9	12.2	5	36	0	3.5	3.0
E86-5941	11.5	6.9	5	27	0	-	-

Continued.

Table 1. Continued.

Brand/Entry	Yield[1] C	Yield[1] H	Lodging[2]	Plant height	Leaf rust[3]	Septoria[4]	Bacteria[5]
AR 26415	5.1	4.3	5	30	80	-	-
FFR 555 W	2.6	2.6	5	26	70	7.0	3.0
HX 2243	1.5	13.2	3	32	55	3.0	3.0
Mean	42.3	46.3	3	37	13	3.8	2.8
CV (%)	16	16	-	-	68	14	20
LSD (0.10)	8.6	8.6	-	-	21	1.4	1.5

[1] Yields in bu/A adjusted to 13% moisture: C = conventional management; H = High management - (fungicide and extra nitrogen applied).

[2] Rated on a scale of 1 to 5, with 1 indicating no lodging and 5 indicating that all plants were prostrate.

[3] Percent of upper three leaves affected. Excessive rainfall delayed raining and prevented some of the earliest entries from being properly rated.

[4] Septoria and glume blotch rated on a scale of 1 to 9, with 1 indicating no disease and 9 indicating severe disease on flag leaves and heads.

[5] Xanthomonas (bacterial streak) rated on a scale of 1 to 9, with 1 indicating no disease and 9 indicating severe disease on the flag leaf and heads.

Table 2. Performance of entries in the wheat performance trials at the Rice Research Station, Crowley, LA, for three years.

Variety	Yield[1]	Test weight[1]	Heading date[2]	Leaf rust[3]	Septoria[4]	Bacteria
FFR 525 W	53.2	56.3	88	6.7	3.2	2.7
Coker 9877	52.7	55.4	86	0.0	3.5	2.3
Coker 9766	51.6	55.4	85	0.0	3.3	2.8
Florida 302	48.6	55.7	86	5.0	4.7	2.0
Terral 101	48.6	54.7	94	0.3	3.0	2.0
Coker 9323	45.5	55.2	78	0.3	4.0	2.2
Terral 812	45.0	56.2	86	2.0	4.2	2.8
Traveler	44.4	55.8	80	5.0	4.5	2.5
Florida 303	37.6	55.6	71	0.0	5.2	3.2
Coker 9227	32.3	56.0	84	0.0	3.2	2.2
Mean	46.0	55.6	84	2.0	3.9	2.5
CV (%)	20.0	1.0	-	181	23	24
LSD (0.10)	6.3	0.6	-	3.0	0.9	0.6

[1] Mean of tests in 1988, 1989, and 1991 adjusted to 13% moisture.
[2] Days after January 1.
[3] Percent of upper three leaves affected.
[4] Rated on a scale of 1 to 9 with 1 indicating no disease and 9 indicating severe disease on flag leaves and heads.

KENAF VARIETY TEST

R.J. Habetz

Location: Rice Research Station

Soil Type: Crowley silt loam

Planting Date: June 5, 1991

Row Spacing: 32 in

Fertilizer: 80-40-40 (N-P_2O_5-K_2O) banded at planting; 68-0-0-(45%) topdress on July 3

Plot Size: 4 rows x 30 ft

Herbicide: 2 pt/A Dual

Rainfall: 1st week after planting, 4.17 in; 2nd week, .76 in.; 3rd week, 1.35 in

Harvested: Nov. 6

Experimental Design: Randomized complete block, four replications

Comments: Kenaf (Hibiscus cannabinus) is a fiber crop which research has shown can be used for newsprint, pressboard, sacks, and cattle feed. One of the most promising factors of Kenaf is that it is very biodegradable.

Unlike the past year, rainfall was much higher this year. During the growing season, there was a total of 26.88 inches of rainfall. An early frost in October helped defoliate plants and probably had an affect on total yield. Nematodes, a major problem of Kenaf, may have also had an affect on yield, but probably the biggest cause of yield reduction was the late planting date, due to the weather conditions. Some disease was found on 45-9X. The variety 15-2 showed the highest yield (3.85 T/A) for the second year (Table 1). Overall, yield was much lower than in the previous year of evaluation for all varieties.

Table 1. Performance of Kenaf varieties grown on a Crowley silt loam soil at the Rice Research Station, Crowley, LA. 1991.

Variety	Yield lb/A	Variety	Yield lb/A
1) 15-2	7698	6) Tainung 2	5480
2) Tainung 1	6727	7) 45-9X	5389
3) Everglades 71	6478	8) Cubano	4989
4) Everglades 41	6201	9) 19-117-2	4979
5) 78-18RS 10	5999	10) C-108	4967
Mean		5891	
CV (%)		16.63	
LSD (0.05)		1414	

SOYBEAN SUBSOIL TEST

R.J. Habetz

Location: Rice Research Station

Soil Type: Crowley silt loam

Variety/Seeding Rate: Hartz 6686 - No-till, 50 lb/A; drill broadcast, 85 lb/A; conventional rows, 50 lb/A

Planting Date: June 17, 1991

Row Spacing: No till, 30 in; drill, 7 in; rows, 30 in

Fertilizer: 0-80-80 (N-P_2O_5-K_2O) broadcast preplant

Plot Size: 10 x 30 ft

Subsoil: 15 to 17 inches deep

Herbicide: 1.0 qt/A Roundup as burndown; 2.0 pt/A Dual, .5 lb Sencor applied PES

Rainfall: 1st week after planting, 1.31 in; 2nd week, 1.40 in; 3rd week, 2.79 in

Harvested: Nov. 12

Experimental Design: Randomized complete block, four replications

Comments: In southwest Louisiana where rice is grown, a hardpan occurs approximately 6 to 8 inches below the soil surface. For better soybean root penetration, this hardpan should be broken. This test was initiated to compare subsoiling verses no subsoiling with different methods of planting soybeans. No-till, conventional tillage, rows, drilled, and broadcast methods were all used.

When subsoil was compared with non-subsoil, there was no difference in yield. The subsoil plots had a yield of 49.7 bu/A compared with 49.8 for non-subsoil. Large amounts of rainfall during the growing season may have had an effect on the small difference. The highest yielding treatment was conventional tillage, drilled, and subsoiled (57.1 bu/A) followed by conventional tillage and drill (Table 1). Planting method showed a significant difference of conventional over no-till planting, while conventional tillage, broadcast, and subsoil showed the highest plant height.

Table 1. Performance of subsoil verses no subsoil in a conventional tillage and no-till soil at the Rice Research Station, Crowley, LA. 1991.

Treatment	Yield	Plant height at maturity	Height of lower pod above ground
Conventional till-drill-subsoil	57.1	26	4
Conventional till-drill-no subsoil	55.5	26	4
Conventional-broadcast-subsoil	53.9	27	4
Conventional-rows-no subsoil	51.3	23	3
Conventional-broadcast-no subsoil	50.8	26	4
Conventional-rows-subsoil	50.5	24	3
No-till-no subsoil	41.4	21	3
No-till-subsoil	37.3	21	3
Mean	49.7	24	4
CV (%)	15.4		
LSD (0.05)	4.7		

SOYBEAN WEED CONTROL RESEARCH

R.J. Habetz

INTRODUCTION

Southwest Louisiana has an abundance of weed species, some not commonly found in other areas of the state. Our climatic conditions are favorable to prolific weed growth and subsequent competition with crop species. Weather conditions are variable requiring different herbicide response evaluations, such as preemergence herbicides which are not effective due to dry weather or the use of overtop herbicides followed by large amounts of rainfall. Another question to be addressed is whether reduced rates will provide effective weed control.

Selected weed areas at the Rice Research Station were used and had uniform weed populations. Weed species evaluated for control were: pitted morningglory (*Ipomea lacunosa* L.), cocklebur (*Xanthium strumarium* L.), sicklepod (*Cassia obtusifolia* L.), redweed (*Melochia corchorifolia* L.), red rice (*Oryza sativa*), and annual grasses. Specific information on location, soil type, variety, row spacing, treatment data, sprayer type, etc., for each experiment is individually presented followed by the results.

Experiment:	Sicklepod Control Study
Soil Type:	Crowley silt loam
Variety/Seeding Rate:	Centennial, 50 lb/A
Planting Date:	June 5, 1991
Row Spacing:	30 in
Fertilizer:	None
Plot Size:	4 rows x 25 ft (treat 2 rows)
Treated:	June 23 (POT 1); July 3 (POT 2)
Crop Size:	V2
Weed Size:	1-2 leaf
Sprayer:	Tractor compressed air, 20 GPA, 11003 nozzles, 25 psi
Rated:	POT 1, July 8; POT 2, July 12
Rainfall:	1st week after planting, 3.67 in; 2nd week, .76 in; 3rd week, 1.35 in
Experimental Design:	Randomized complete block, four replications

Table 1. Sicklepod control (SP) using postemergence herbicides. Rice Research Station, Crowley, LA. 1991.

Treatment[1]	Rate of application	Application time	Weed Control 7/8 SP (%)
	-(lb ai/A)		
Cadre	.008	POT 1	56
Cadre	.012	POT 1	54
Cadre	.016	POT 1	73
Scepter/Cadre	.063/.012	POT 1	78
Scepter/Cadre	.063/.016	POT 1	86
Scepter/Cadre	.032/.012	POT 1	78
Scepter/Cadre	.032/.016	POT 1	78
Pursuit/Cadre	.032/.012	POT 1	65
Pursuit/Cadre	.032/.016	POT 1	77
Cadre/Cadre	.008/.012	POT 1/POT 2[2]	92
Cadre/Cadre	.008/.008	POT 1/POT 2	80
Pursuit	.063	POT 1	67
Classic	.008	POT 1	68
Storm[3]	0.75	POT 1	45
Scepter OT	0.32	POT 1	66
Scepter OT/Cadre	0.32/.008	POT 1	81
Scepter OT/Cadre	0.32/.012	POT 1	88
Check	-	-	-
LSD (0.05)			13.6
CV (%)			14.0

[1] X-77 nonionic surfactant added at 0.25% (v/v) to all treatments except Storm. Dual applied to all treatments for grass control.
[2] POT 2 applied 10 days after POT 1.
[3] Agridex crop oil concentrate added at 1 pt/A.

Experiment:	Stale Seedbed Study
Soil Type:	Crowley silt loam
Variety/Seeding Rate:	Centennial, 50 lb/A
Planting Date:	June 25, 1991
Row Spacing:	30 in
Fertilizer:	None
Plot Size:	3 rows x 25 ft (treat 2 rows)
Treated:	June 26 (burndown and PES); July 18 (POT)
Weed Size:	PES: AG, 3-4 in; RW, 2-3 in; POT: AG, 3-4 in; RW 3-4 in
Crop Size:	V2
Sprayer:	Tractor compressed air, 20 GPA, 11003 nozzles, 25 psi
Rated:	August 1
Rainfall:	1st week after planting, 1.40 in; 2nd week, 3.49 in; 3rd week, .16 in
Experimental Design:	Randomized complete block, four replications

Table 2. Annual grasses (AG) and redweed (RW) control using pre- and postemergence herbicides on a stale seedbed. Rice Research Station, Crowley, LA. 1991.

Treatment[1]	Rate of application	Application time	Weed control 8/1 AG	Weed control 8/1 RW
	-(lb ai/A)-			
Gramoxone Super + Dual	0.38 + 2.00	PES	48	0
Gramoxone Super + Dual + Canopy	0.38+2.00+0.38	PES	93	94
Gramoxone Super + Dual + Scepter	0.38+2.00+.125	PES	65	49
Gramoxone Super + Dual + Sencor	0.38+2.00+0.38	PES	85	55
Gramoxone Super + Fusilade 2000 + Reflex	0.38+.188+0.38	PES/POT/POT	71	63
Gramoxone Super + Goal	0.38 + 0.30	PES	35	46
Roundup + Dual	1.00 + 2.00	PES	54	0
Roundup + Dual + Canopy	1.00+2.00+0.38	PES	69	91
Roundup + Dual + Scepter	1.00+2.00+.125	PES	71	51
Roundup + Dual + Sencor	1.00+2.00+0.38	PES	70	40
Roundup + Fusilade 2000 + Reflex	1.00+.188+0.38	PES/POT/POT	83	68
Roundup + Goal	1.00 + 0.30	PES	71	38
Ignite + Dual	0.75 + 2.00	PES	36	0
Ignite + Dual + Canopy	0.75+2.00+0.38	PES	88	89
Ignite + Dual + Scepter	0.75+2.00+.125	PES	72	52
Ignite + Dual + Sencor	0.75+2.00+0.38	PES	75	46
Ignite + Fusilade 2000 + Reflex	0.75+.188+0.38	PES/POT/POT	59	62
Ignite + Goal	0.75 + 0.30	PES	40	46
Goal	0.30	PES	30	64
Goal	0.40	PES	35	70
Check	-	-	-	-
LSD (0.05)			17.6	15.8
CV (%)			20.8	22.8

[1] X-77 nonionic surfactant added at 0.25% (v/v).

Experiment:	Broadleaf Tankmix Test
Soil Type:	Crowley silt loam
Variety/Seeding Rate:	Centennial, 50 lb/A
Planting Date:	June 17, 1991
Row Spacing:	30 in
Fertilizer:	None
Plot Size:	3 rows (treat 2 rows)
Treated:	July 11
Weed Size:	3-4 in
Crop Size:	V3
Sprayer:	Tractor compressed air, 20 GPA, 11003 nozzles, 25 psi
Rated:	August 1
Rainfall:	1st week after planting, 1.31 in; 2nd week, 1.40 in; 3rd week, 3.49 in
Experimental Design:	Randomized complete block, four replications

Table 3. Cocklebur (CB) and pitted morningglory (PMG) control using postemergence tankmix herbicides. Rice Research Station, Crowley, LA. 1991.

Treatment[1]	Rate of application	Application time	Weed Control 8/1 MG	Weed Control 8/1 CB
	-(lb ai/A)-			
Storm	0.75	POT	84	96
Cobra/Classic	.125/.006	POT	97	97
Cobra/Reflex	.156/0.25	POT	96	96
Cobra/Reflex	0.10/.375	POT	94	97
Cobra/Reflex	0.20/.375	POT	97	98
Cobra/Scepter	.156/.094	POT	96	98
Cobra/Scepter	0.10/.125	POT	95	98
Cobra/Scepter	0.20/.125	POT	95	96
Classic/Reflex	.006/.375	POT	94	96
Classic/Reflex	.008/0.25	POT	94	95
Classic/Reflex	.008/.375	POT	95	96
Classic/Scepter	.006/.125	POT	96	98
Classic/Scepter	.008/.094	POT	96	98
Classic/Scepter	.006/.094	POT	96	98
Classic/Scepter	.008/.125	POT	97	98
Scepter/Reflex	.094/.375	POT	94	97
Scepter/Reflex	.125/0.25	POT	96	98
Scetper/Reflex	.094/0.25	POT	94	98
Scepter/Reflex	.125/.375	POT	95	97
Classic/Reflex	.006/0.25	POT	94	96
Check	-	-	-	-
LSD (0.05)			3.2	1.8
CV (%)			2.5	1.4

[1] X-77 nonionic surfactant added at .025% (v/v). Dual applied preemerge at 2.00 pt/A for grass control.

Experiment:	Reduced Rates Test
Soil Type:	Crowley silt loam
Variety/Seeding Rate:	Centennial, 50 lb/A
Planting Date:	June 17, 1991
Row Spacing:	30 in
Fertilizer:	None
Plot Size:	3 rows (treat 2 rows)
Treated:	June 17 (PES); July 1 (1/2 rates); July 11 (full rates)
Weed Size:	Early post (1/2 rates), 7 days after weed emergence; Late post (full rate) 2-3 in
Crop Size:	Late Post V3
Sprayer:	Tractor compressed air, 20 GPA, 11003 nozzles, 25 psi
Rated:	August 1
Rainfall:	1st week after planting, 1.31 in; 2nd week, 1.40 in; 3rd week, 3.49 in
Experimental Design:	Randomized complete block, four replications

Table 4. Pitted morningglory (PMG) and cocklebur (CB) control using pre- and postemergence herbicides at reduced and full rates. Rice Research Station, Crowley, LA. 1991.

Treatment[1]	Rate of application	Application time	Weed Control 8/1 PMG	Weed Control 8/1 CB
	(lb ai/A)			
Canopy	0.38	PES	96	97
Scepter	.125	PES	76	92
Sencor	0.38	PES	52	45
Blazer	0.19	EP[2]	45	41
Blazer	0.38	LP[3]	93	96
Cobra	0.10	EP	66	69
Cobra	0.20	LP	94	95
Scepter	0.06	EP	72	87
Scepter	.125	LP	94	97
Classic	.004	EP	48	44
Classic	.008	LP	95	95
Reflex	.188	EP	56	64
Reflex	.375	LP	92	94
Fusilade 2000/Reflex	0.63/.188	EP	68	72
Fusilade 2000/Reflex	.125/.375	LP	91	94
Storm	0.38	EP	62	68
Storm	0.75	LP	90	94
Cobra/Classic	.075/.004	EP	69	77
Cobra/Classic	0.15/.008	LP	97	98
Check	-	-	-	-
LSD (0.05)			17.4	14.8
CV (%)			16.8	13.7

[1] X-77 nonionic surfactant added at 0.25% (v/v) to all treatments. Dual added at 2.00 pt/A to all treatments, except Fusilade 2000 treatments, for grass control.

[2] EP - Early post.

[3] LP - Late post.

Experiment:	Red Rice Control Test
Soil Type:	Crowley silt loam
Variety/Seeding Rate:	Centennial, 50 lb/A
Planting Date:	July 23, 1991
Row Spacing:	30 in
Fertilizer:	None
Plot Size:	3 rows (treat 2 rows)
Treated:	August 7
Weed Size:	2-3 in
Crop Size:	V2
Sprayer:	Tractor compressed air, 20 GPA, 11003 nozzles, 25 psi
Rated:	August 21
Rainfall:	1st week after planting, 1.75 in; 2nd week, .05 in; 3rd week, 2.23 in
Experimental Design:	Randomized complete block, four replications

Table 5. Red rice (RR) control using postemergence grass herbicides. Rice Research Station, Crowley, LA. 1991.

Treatment[1]	Rate of application	Application time	Weed Control 8/21 RR
	-(lb ai/A)-		
Scepter	.125	POT	96
Scepter	.188	POT	97
Poast Plus	0.38	POT	94
Fusilade 2000	0.25	POT	92
Assure II	.005	POT	91
Select	.094	POT	90
Cadre	.012	POT	88
Poast	0.38	POT	89
Check	-	-	-
LSD (0.05)			3.8
CV (%)			3.2

[1] Agridex crop oil concentrate added at 1 qt/A.

INTRODUCTION OF A NUCLEAR POLYHEDROSIS VIRUS FOR LONG-TERM SUPPRESSION OF VELVETBEAN CATERPILLARS IN SOYBEANS

J.R. Fuxa

The persistence and spread after release of *Anticarsia gemmatalis* (Ag) nuclear polyhedrosis virus (NPV) was studied at two sites. The experiment was in its second year at the Rice Research Station near Crowley, Louisiana. Bioassays of predatory arthropods sampled from the Crowley release site in 1990 implicated a wide range of these arthropods as agents of viral transport. A total of 38% of these predators (primarily Hemiptera and spiders, but also Coleoptera, Diptera, and Hymenoptera) were contaminated with the AgNPV. Furthermore, the maximum distances by date at which contaminated predators were detected from release plots were significantly correlated ($P<0.01$) with the distances at which infected Ag were sampled, further implicating predators in viral transport. The NPV population declined over winter from 26695 viral polyhedral inclusion bodies (PIB)/g soil to 3666 PIB/g. However, the latter was sufficient to initiate viral epizootics in the Ag population in 1991. Viral prevalence averaged 18% (maximum average 32% on one sampling date) over the entire field (treated plot plus areas where NPV spread in 1990) during the 41-day 1991 sampling period. Small amounts of virus were detected in the soil and in the Ag population in the control area, probably due to its transport by farm equipment. Thus, by the second year after release, the AgNPV had spread at least 114 m outside the sprayed plot, though NPV prevalence was <10% at distances >44 m (the maximum spread distance in 1990). The field will be sampled again in 1992 to obtain data on the main experimental variable, the effect of crop rotation on persistence of the NPV.

AQUACULTURE RESEARCH

ANNUAL SUMMARY OF ENVIRONMENTAL CONDITIONS AND CRAWFISH PRODUCTION

W. R. McClain, K. Taylor, and J. Sonnier

Following is the average weekly data for environmental conditions and crawfish catch, 1990-91 season, crawfish research project, Rice Research Station, Crowley, LA. The summary is composed of averages across all experimental plots and management conditions.

Pond History: All experimental ponds had a prior history as crawfish production units but were idle for 2 years previous to the one summarized.

Soil Type: Crowley silt loam

Water Source: Well water that traveled through 3600 feet of earthen canals prior to its entrance to crawfish ponds

Pond Area: Twenty 0.4 acre ponds

Forage Crops:

Crop	Planting Date:
Rice ('Mars')	June 25, 1990
Rice ('Mars')	August 7, 1990
Grain Sorghum ('Pioneer DK64')	August 7, 1990
Sorghum-Sudangrass Hybrid ('Pioneer 855F')	August 7, 1990
Rice/Sorghum-Sudangrass Mix	August 7, 1990

Permanent Flood Date: October 1, 1990

Crawfish Harvest: Trapping began February 9, 1991 and continued through May 1991. Crawfish were harvested a total of 46 days with 30 traps/acre for a total of 1380 trap-days per acre per season.

Trap type: 3-funnel pyramid

Bait Used: Fish and manufacture bait (Purina and Acadiana Choice)

Table 1. Annual summary of average weekly environmental conditions and crawfish production. Rice Research Station, Crowley, LA. 1991.

Weeks	Average Weekly Soil Temp.[1] Min.	Max.	Average Weekly Air Temp. Min.	Max.	Average Weekly Water Temp. Min.	Max.	Average Weekly D.O.[2] (mg/l)	Average Monthly Forage Biomass (g/m^2)	Weekly Total Water Pumped (gal/A)	Weekly Total Rainfall (inches)	Average Weekly Crawfish Dip Cnts (#/dip)	Average Weekly Crawfish Harvest (lb/A)	Average Weekly Crawfish Size (cnt/lb)	No. Days Harvested (day/wk)
	°F													
June 1-7	79.6	94.9	73.1	90.6						0.40				
June 8-14	80.6	96.9	73.0	91.9						1.19				
June 15-21	83.7	99.9	75.1	95.1						0.05				
June 22-28	82.1	97.4	72.9	91.3						0.27				
June 29-July 5	81.9	96.1	73.7	91.4						0.40				
July 6-12	81.0	95.2	73.3	91.8						0.15				
July 13-19	75.0	86.6	68.7	84.3						1.67				
July 20-26	78.0	91.7	71.4	89.7						1.61				
July 27-Aug 2	81.4	96.1	74.1	93.1						0.57				
Aug 3-9	80.3	95.3	70.0	91.3						0.12				
Aug 10-16	80.7	97.6	67.7	92.3						0.00				
Aug 17-23	83.9	98.6	72.9	95.0						0.20				
Aug 24-30	83.9	99.1	74.4	96.6						0.78				
Aug 31-Sept 6	81.0	96.4	71.4	94.7						1.02				
Sept 7-13	77.3	86.3	71.5	84.5						1.86				
Sept 14-20	78.3	91.8	73.0	90.3						0.51				
Sept 21-27	71.4	88.1	62.9	85.9						0.87				
Sept 28-Oct 4	75.4	91.7	66.7	89.9				319.08	81,000	0.75				
Oct 5-11	59.9	86.3	63.3	84.1	54.5	71.6	4.5		162,000	0.05				
Oct 12-18	63.3	80.0	53.7	80.3	61.5	73.4	3.6		202,500	0.02	0.06			
Oct 19-25	60.3	74.7	43.6	73.6	57.6	69.6	4.7		121,500	1.60	0.14			
Oct 26-Nov 1	55.7	72.7	43.7	74.4	55.2	66.9	4.6	420.32	121,500	0.00	0.28			
Nov 2-8	57.7	72.3	50.4	64.9	55.9	65.7	5.7		121,500	0.50	0.28			
Nov 9-15	52.4	65.9	45.1	69.7	54.0	61.7	6.7		81,000	1.23	0.06			
Nov 16-22	60.1	71.7	54.4	76.9	60.1	68.5	4.0		40,500	0.00	0.10			
Nov 23-29	60.3	70.9	55.1	76.4	60.8	69.8	4.4			1.10	0.01			
Nov 30-Dec 6	48.0	61.7	41.1	63.7	47.5	58.6	7.7	326.36		2.50	0.04			

(continued)

Table 1. Continued.

Weeks	Average Weekly Soil Temp.[1] Min.	Average Weekly Soil Temp.[1] Max.	Average Weekly Air Temp. Min.	Average Weekly Air Temp. Max.	Average Weekly Water Temp. Min.	Average Weekly Water Temp. Max.	Average Weekly D.O.[2] (mg/l)	Average Monthly Forage Biomass (g/m^2)	Weekly Total Water Pumped (gal/A)	Weekly Total Rainfall (inches)	Average Weekly Crawfish Dip Cnts (#/dip)	Average Weekly Crawfish Harvest (lb/A)	Average Weekly Crawfish Size (cnt/lb)	No. Days Harvested (day/wk)
	°F													
Dec 7-13	46.3	58.3	42.1	64.0	49.5	57.7	8.2			1.20	0.13			
Dec 14-20	59.0	67.1	56.0	73.1	59.2	68.4	5.1			0.10	0.01			
Dec 21-27	49.1	52.0	38.7	55.0	64.4	69.8	5.2			0.70	-----			
Dec 28-Jan 3	51.6	58.4	45.0	58.1	39.7	57.2	9.3	342.80		2.30	0.08			
Jan 4-10	50.6	57.4	42.7	56.7	45.1	49.3	8.9			2.97	0.03			
Jan 11-17	47.1	58.7	39.3	59.6	45.3	52.0	8.8			3.50	0.04			
Jan 18-24	45.4	55.1	39.3	55.1	41.2	52.3	10.0			2.32	0.04			
Jan 25-31	48.6	55.7	43.4	56.9	45.9	57.0	7.8	226.84		1.15	0.08			
Feb 1-7	51.4	61.6	47.4	66.1	52.9	63.9	7.4			2.93	0.00			
Feb 8-14	52.7	63.4	44.3	60.9	54.1	66.7	6.1		81,000	0.00	0.00			
Feb 15-21	54.1	62.0	47.1	65.3	52.3	65.8	8.3			2.62	0.06	2.96	21.4	1
Feb 22-28	51.6	61.6	43.0	62.3	50.0	63.9	8.0	177.14		0.85	0.36	17.13	19.3	3
Mar 1-7	59.4	67.0	54.4	69.3	54.7	70.2	8.4			1.27	0.19	14.94	19.0	3
Mar 8-14	55.7	69.3	46.1	70.3	54.9	70.9	7.5		40,500	0.02	0.19	8.56	17.7	1
Mar 15-21	54.4	65.7	49.1	65.6	56.3	70.2	7.6			1.22	0.26	30.12	17.4	3
Mar 22-28	66.9	77.6	64.0	80.6	69.1	79.7	6.8		81,000	0.00	0.17	49.84	16.2	4
Mar 29-Apr 4	60.6	74.7	48.4	72.4	56.7	74.7	6.6	171.48		0.30	0.07	27.76	14.7	2
Apr 5-11	68.1	77.0	64.1	80.3	67.8	80.4	5.0		81,000	0.60	0.28	59.65	14.3	5
Apr 12-18	68.4	78.0	66.7	79.9	67.6	80.6	5.9			4.87	0.08	22.28	14.0	2
Apr 19-25	66.9	82.1	61.6	78.9	66.9	84.7	5.2			0.00	0.01	57.00	13.0	4
Apr 26-May 2	70.3	79.1	67.6	79.3	70.7	84.2	5.3	84.82		4.44	0.04	29.54	12.6	2
May 3-9	70.1	82.7	65.7	80.9	69.1	81.7	7.9			4.09		47.04	12.4	3
May 10-16	73.9	86.4	68.9	83.9	70.5	84.7	6.2			3.71		32.14	12.6	2
May 17-23	73.4	81.3	70.6	83.7	73.6	84.7	6.5			0.45		56.35	12.2	5
May 24-31	75.9	86.5	72.9	85.9	77.5	88.7	4.3	36.06		3.89		41.88	15.1	6
TOTAL									1,215,000	64.92		497.19		46

[1] Soil temperature was measured at a depth of 4 inches.
[2] Dissolved oxygen readings were taken about 8:00 a.m.

BIOMASS PRODUCTION AND PERSISTENCE OF SOME TYPICAL CRAWFISH FORAGES

W. Ray McClain, Kelly Taylor, and John Sonnier

INTRODUCTION

Crawfish production in Louisiana typically depends solely on a forage-based food system to supply all the nutrition for culturing crawfish. Agronomic forages which support a vegetative detrital system have proven to be reliable and cost-effective sources of nourishment. The detrital system encompasses decomposing plant material that hosts a multitude of microorganisms and other associated organisms, such as aquatic worms, insect larvae, snails, and other numerous small invertebrates. Crawfish feed on the rich microbial laden plant detritus and the myriad of organisms that are associated with it. The establishment of an adequate forage crop prior to and after "flood-up" is necessary in order to provide a constant supply of plant fragments to the detrital system for the duration of the crawfish season. Often forage systems are depleted prior to the end of the crawfish production season, which results in nutritional shortages in the pond, and thus, economical shortfalls for the producer.

Rice has been the most reliable forage to date, but sorghums appear to have potential as alternatives to rice as agronomic forage. Several studies have characterized forage types, planting dates, and agronomic practices in relation to biomass of plant material at flood-up. However, little attention has focussed on the persistence profile of different forage types and maturity stage of crawfish forages during and throughout the season.

MATERIALS AND METHODS

This study was conducted to compare five forage-types in terms of their vegetative biomass production and persistence through the crawfish season. Biomass is the amount of material present, both living and dead, and is expressed on a dry weight basis. The forage types evaluated in this study consisted of an early (June) and late planting of rice, sorghum-sudangrass, grain sorghum, and a mixture of sorghum-sudangrass and rice. The latter four types were planted the first of August. All ponds were flooded 1 October and treated similarly (managed to simulate commercial crawfish ponds). Biomass samples were taken at flood-up and monthly thereafter for the duration of the crawfish season.

The June planted rice headed and reached its physiological maturity prior to flood-up. The August planted rice headed just prior to the first frost but the panicles had not filled grain; therefore, it did not reach its physiological maturity. This provided a good comparison for effects of maturity and senescence on biomass persistence.

Plant material was also characterized for decomposition rate under pond conditions in this study. It was desired to determine the rate of decomposition of these same forage types when they were exposed to pond conditions exclusive of crawfish consumption or molestation. Leaves were collected from the respective plants immediately prior to flood-up, frozen and stored (at -18°C) until use. Straw ("combine tailings") was collected from a rice field approximately 2 weeks after harvest and frozen until used. After material was thawed and the percent dry matter determined for each, preweighed amounts were placed in numerous 6" wide X 1" deep PVC cylindrical rings with small mesh (250 μm) screens stretched over the ends. These were placed in ponds in mid October and duplicate containers of each forage type were pulled each month, dried, and the percent dry matter disappearance estimated.

SUMMARY AND DISCUSSION

The early planted rice had a higher vegetative biomass at flood-up than any other forage-type tested (Fig. 1). However, biomass from this treatment was highest at this first measurement and generally declined after being flooded. This was attributed to the plant having matured and, consequently, was in a state of senescence. The late planted rice had the lowest biomass at flood-up but continued to grow and greatly increased its biomass until halted by freezing temperatures. The other forage types, also being in the immature/growth phase, likewise increased in biomass after flood-up. These forages declined in biomass after the first freeze but persisted better than the early planted rice.

There appears to be some differences in the decomposition rate of the different forage types, especially during the first 30 days (Fig. 2). Dry matter loss ranged from under 20% to over 60% in the first month. The early planted rice leaves and the "combine debris" (straw) were more resistant to decomposition. This was probably due to a higher proportion of structural carbohydrates for these material. However, all materials had lost at least 70% of its dry mass by February. This indicates the need for staggered and consistent fragmentation of material to the detrital system.

The characteristics of late planted rice suggest that it is more appropriate as a crawfish forage. Of the other forage types tested, only sorghum-sudangrass appeared similar to August planted rice in its vegetative biomass production and persistence. It can be assumed that a mature agronomic crop, regardless of type, will be less desirable as a crawfish forage because of possible rapid disappearance and early depletion. Other considerations for the timing of planting should be: (1) stand establishment requirements, (2) weather, (3) time to achieve maximum biomass without physiological maturation, (4) forage type, and (5) governmental "set aside" restrictions.

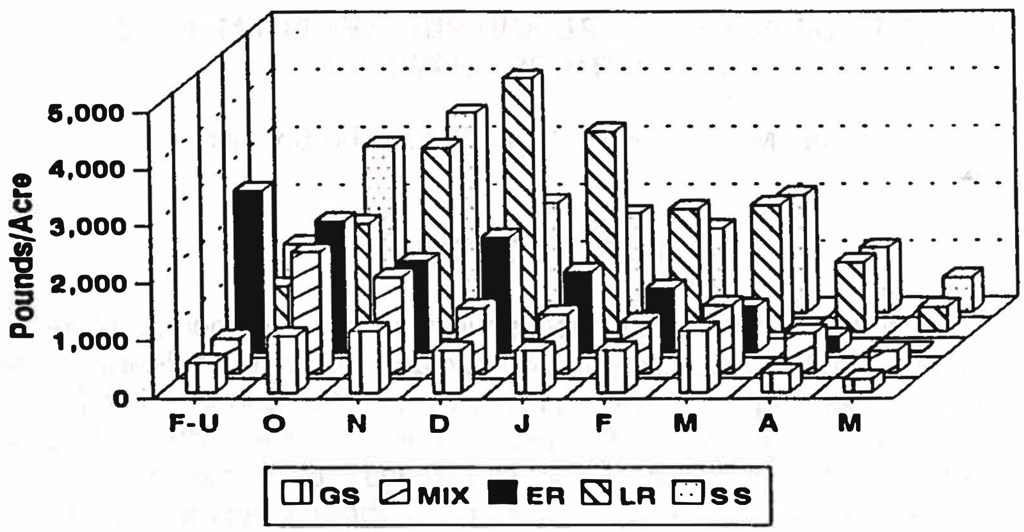


Figure 1. Forage biomass (lb/A dry wt.) at flood-up (Oct. 1) and each month during the crawfish season for grain sorghum (GS), sorghum-sudangrass (SS), early planted rice (ER), late planted rice (LR), and a mixture of sorghum-sudangrass and late rice (MIX).

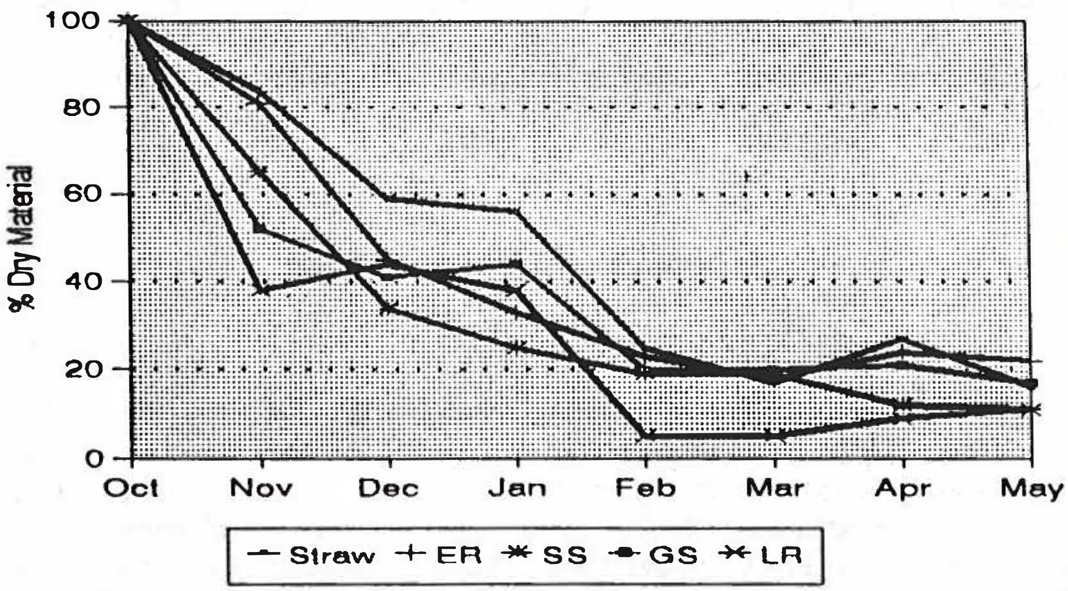


Figure 2. Dry matter retention of inundated rice straw and leaves of early rice (ER), sorghum-sudangrass (SS), grain sorghum (GS), and late planted rice (LR) during the crawfish season.

EFFECTS OF FORAGE TYPE AND SUPPLEMENTAL FEED ON GROWTH OF CRAWFISH

W. Ray McClain, Kelly Taylor, and John Sonnier

INTRODUCTION

The most economically feasible food source for the commercial production of crawfish is the use of planted forage crops. Crawfish aquaculture in Louisiana traditionally uses two approaches for propagating forage crops in crawfish ponds. First, forages are planted solely to provide food for crawfish with no concern for an additional cash crop. Rice has been the most reliable and widely used forage crop to date for this purpose; however, the sorghums (mainly sorghum-sudangrass hybrid) appear to have potential as alternatives to rice. Secondly, a grain crop (rice or grain sorghum) is cultivated as a cash crop then the stubble and ratoon growth are utilized as the forage base for the production of crawfish.

Established forages in crawfish ponds are presumably the primary food resources and act more as feed delivery systems than as direct feed since nutrients probably are cycled through one or more trophic levels prior to substantial use by crawfish. It has recently been shown that microbially enriched plant detritus and larger organisms associated with this component supply the bulk of the required nutrition for crawfish. Little is known of just how well different forage crops perform as primary suppliers to this complex food/feed system and whether or not there are nutritional deficiencies in the system, and if so, when does it occur. Therefore, several field studies were conducted in an attempt to answer this question for some of the more common agronomic forage crops.

MATERIALS AND METHODS

Two pond studies, utilizing wire-mesh enclosures, were conducted to determine the effect of different forage types on crawfish growth. In one study, the effect of supplemental feed on growth was additionally evaluated. These growth experiments were conducted in 0.4 acre ponds utilizing small-mesh (5 mm) wire enclosures of cylindrical shape (0.5 m^2 surface area) that were placed over forage substrates in the pond. Small crawfish were weighed initially, stocked in the enclosures at two test densities (2 and 20 crawfish/m^2), then subsequently retrieved and measured for growth at 6 and 12 weeks. At each 6-week weigh period, missing crawfish were replaced by reserves of similar weight to the average for each group. This was done to maintain continuity in the density effect. All experimental ponds were treated alike and managed to simulate commercial crawfish pond conditions. The enclosures contained the crawfish under typical pond-culture conditions where they had access to the usual pond food sources. Both studies were conducted concurrently and, for each study, one growth experiment (12 weeks) was initiated in the fall and another in the spring. Initial weights of crawfish were 0.25 g and 0.47 g, respectively, for the fall and spring experiments of each study.

Study 1

In this study, the five forage-types evaluated in the previous study (Biomass Production and Persistence of Some Typical Crawfish Forages) were further tested for their nutritional quality by comparing their ability to produce crawfish growth. Fields of early planted rice (June) and August planted rice, grain sorghum, sorghum-sudangrass, and a mix of sorghum-sudangrass, and rice each contained 12 enclosures of crawfish placed randomly within the field. Treatments consisted of forage-type X density with six replicates each. Rice was variety Mars and only the early planted rice had produced mature heads at time of flood-up (October 1).

Study 2

This study was carried out in the June-planted rice field where the rice had produced mature heads by late August. Random areas in the field were treated to simulate grain harvest by hand cutting and removing the grain. The cut straw, less the grain, was left in the cut section of some areas to represent "combine tailings." In other cut sections, all straw material was removed in order to generate a comparison of the effect from this component. The stubble was allowed to tiller and regrow to form a ratoon forage crop. Additional areas of the field were treated with Round-Up herbicide shortly after planting and were retreated as needed in order to eliminate any forage material prior to flood-up. Enclosures were placed in these and other areas of the field and stocked with crawfish. One group of crawfish in enclosures of headed rice also received supplemental feed (25% protein, Rex Milling Co., New Iberia, LA) on Mondays, Wednesdays, and Fridays at the equivalent rate of 20 lb/A.

Treatments for this study consisted of enclosures where crawfish had access to either (1) headed rice only, (2) headed rice plus supplemental feed, (3) ratoon rice only, (4) ratoon rice plus straw, or (5) no forage. There were six replicate enclosures for each treatment X density combination.

SUMMARY AND DISCUSSION

Results from both studies showed no significant differences in crawfish growth at either the 6- or 12-week weigh period due to any of the forage or forage/feed treatments of the fall experiments. These results imply that there is not a nutritional deficiency under these conditions in the fall, regardless of forage type. There was, however, a density effect; high density situations act to reduce the growth rate, even when nutrition is adequate.

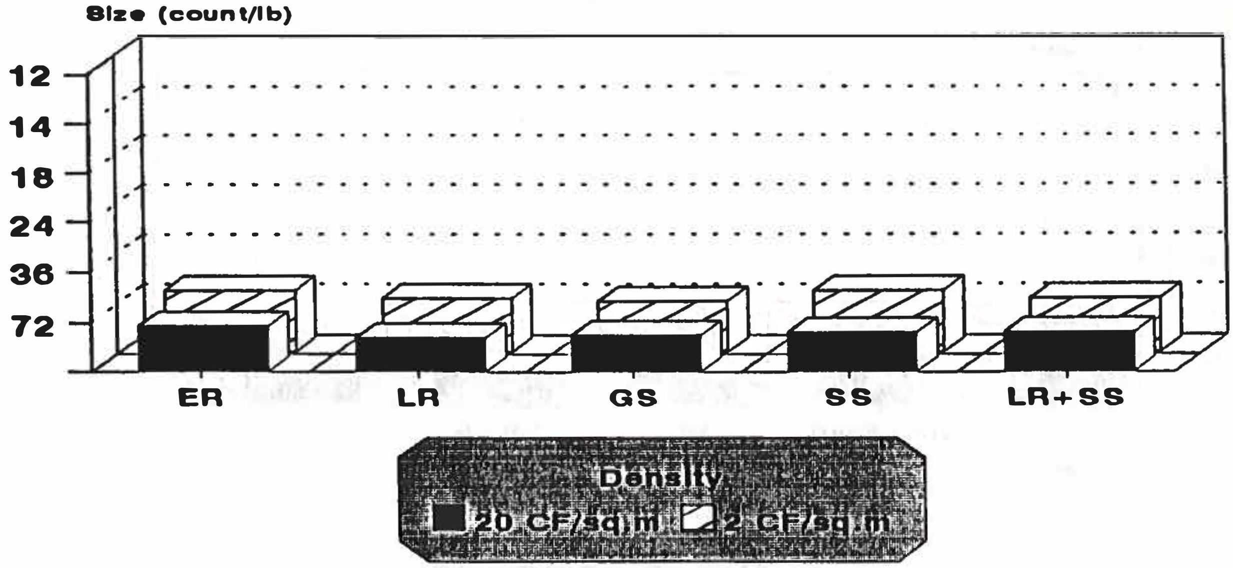
Study 1-spring

Results from this experiment showed no difference in crawfish size from the five forage types evaluated (early rice, late rice, sudangrass, grain sorghum, and sudangrass-rice mix) at 6 weeks for the low density group and only a slight advantage of early rice at the high density group (Fig. 1). Similarly, very little difference existed at 12 weeks due to forage-type. However, growth rate was drastically reduced by high population densities under conditions of this study. It should be noted that only crawfish in the low density group were at commercial harvest sizes at 12 weeks.

Study 2-spring

The most obvious differences in crawfish size from this experiment were due to density (Fig. 2). Growth was drastically reduced by high populations of crawfish. Although some statistical differences existed in the forage-types, they were not large and no obvious trend was observed. The no-forage group was consistently smaller, but nonetheless, they achieved considerable growth with no conspicuous food resources. Obviously, the benthos provided some nutrition and probably some small particles or organisms produced elsewhere in the pond migrated within their reach. The fed group, however, was profoundly larger at both densities. This indicates that there may be some nutritional deficiencies in the pond late in the season from forage-based systems alone. However, all crawfish in the low density group were at commercial sizes but only the crawfish receiving the supplemental feed in the high density group approached an acceptable harvest size by week 12. No economic analysis was considered in this study for the use of supplemental feed and no recommendation is being made at this time concerning the cost/return benefit of supplemental feeding of crawfish.

Crawfish size after 6 weeks



Crawfish size after 12 weeks

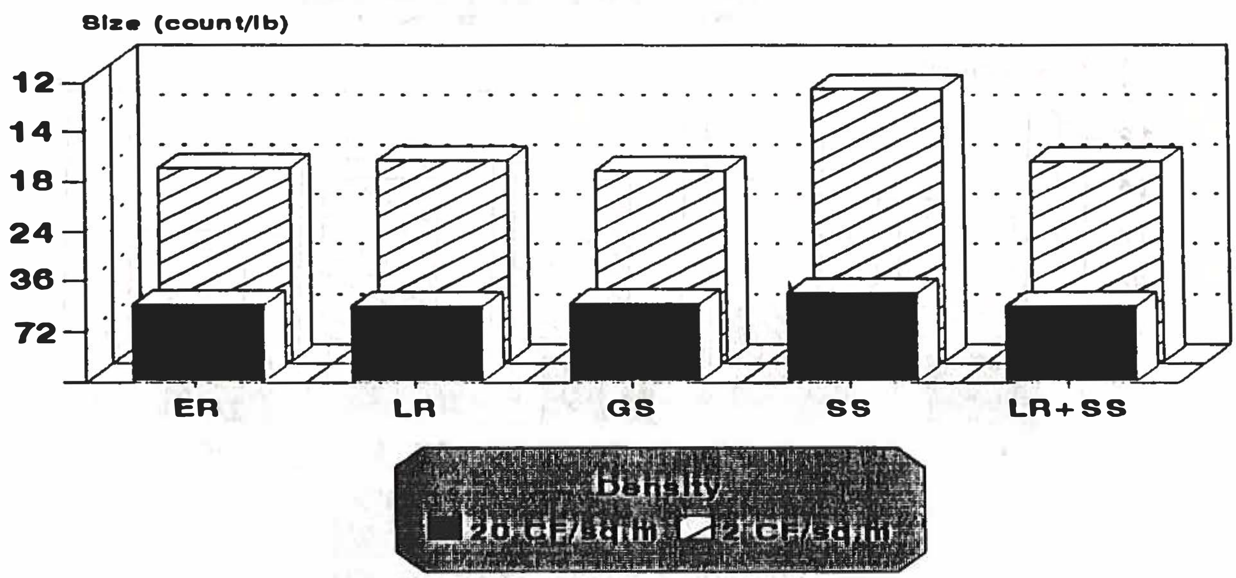


Figure 1. Crawfish growth at 6 and 12 weeks when allowed access to either early planted rice (ER), late planted rice (LR), grain sorghum (GS), sorghum-sudangrass (SS), or mixture of late rice and sorghum-sudangrass (LR+SS) at two densities.

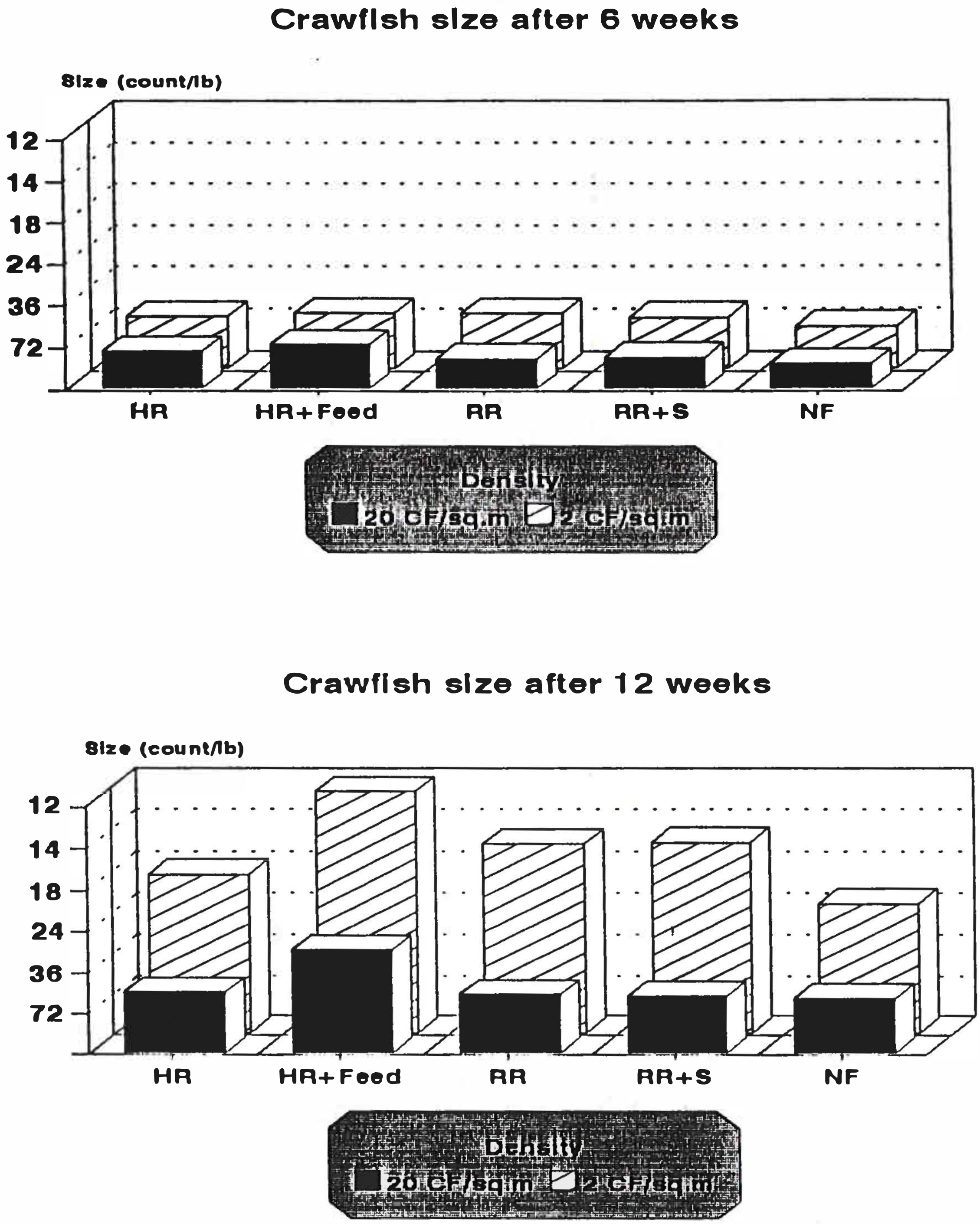


Figure 2. Crawfish growth at 6 and 12 weeks when allowed access to either headed rice only (HR), headed rice plus supplemental feed (HR+Feed), ratoon rice only (RR), ratoon rice plus straw (RR+S), or no forage (NF).

GROWTH RATE AND FEED CONSUMPTION OF CRAWFISH FED A FORMULATED FEED UNDER COMMERCIAL POND CULTURE CONDITIONS

W. Ray McClain, Kelly Taylor, and John Sonnier

INTRODUCTION

Crawfish production in the southern U.S.A. typically depends solely on a vegetative detrital system as the food source. However, at times these forage-based systems become inadequate feed delivery systems, as evidenced when early depletion of vegetation results in decreased crawfish growth and size at maturity. High crawfish population densities, as well as, and especially with, food shortages, are often the cause for small or stunted low-market-value crawfish to be harvested. With the recent advent of mechanical crawfish graders and the establishments of national and international markets that require large crawfish, producers of small crawfish are at an economic disadvantage. Current market demands for large crawfish have created a price differential for 3 - 4 size grades with a price difference for the largest that may be four times greater than the small size grade.

There has been some renewed interest recently in the use of supplemental feeds. The Louisiana Agricultural Experiment Station initiated research in the use of formulated feeds for pond-raised crawfish in the 1960s, which continued into the 1970s and 80s. Several commercial companies who now manufacture crawfish feeds have conducted feeding trials as have other universities. Many of these early studies reported increased yields and some reported increased crawfish sizes, but frequently, feeding practices proved uneconomical and positive results were often inconsistent and difficult to reproduce. In order to generate economic benefits by or predict the economic value of using formulated feeds in commercial crawfish ponds, we have to better understand the biological intricacies of using supplemental feeds. These include such aspects as the effectiveness of supplemental feeds at different times of the season and at different population densities, estimates of crawfish consumption and growth rates, and crawfish's propensity to feeds verses indigenous food sources. This study addresses some of these issues.

MATERIALS AND METHODS

A pond study, utilizing wire-mesh enclosures, was conducted to determine the effect of supplemental feeding on crawfish growth rate and to estimate feed consumption at different feeding rates and crawfish densities. The pond was planted in rice (August 7,1991) and managed to simulate a commercial crawfish pond. Sixteen small-mesh (5 mm) wire enclosures of cylindrical shape (0.5 m^2 surface area) were randomly placed over forage substrates in the pond. The enclosures were used to contain the experimental crawfish to allow accurate retrieval but allowed them access to the typical nutritional provisions.

On 26 February, small crawfish (average wt. = 0.47 g) were placed in enclosures at two densities. Both low and high population densities and feeding rates (Table 1) were combined in a 2 X 2 factorial design and analyzed for simple treatment effects. Each density X feeding-rate treatment was replicated four times. A commercial crawfish feed (25% protein, Rex Milling Company, New Iberia, LA) was given 5 days/week and crawfish were weighed bi-weekly for 12 weeks. At each weigh period, missing crawfish were replaced by reserves of similar weight to the average for each group. This was done to maintain continuity in the density effect.

Feed consumption was estimated by placing the feed in retainer rings equipped with 250 μm mesh screens, retrieving the refuse after 24 hours access by crawfish, and correcting for losses caused by leaching of nutrients and consumption by zooplankton. The later values were obtain from additional samples of feed exposed to the same elements in ponds, but excluded from the crawfish (via 850 μm mesh screens) then retrieved and weighed daily. Thus, the estimated consumption rate consisted of range values: the lower estimated daily consumption (from refuse weights corrected for maximum loss by leaching and consumption by other pond organisms) to the higher estimated consumption (from refuse weights only).

SUMMARY AND DISCUSSION

All comparisons of data for population density and feeding rate were made for each 2-week period only (Table 1). There were little significant differences in either the growth rate (average daily gain) or the average weekly weights of crawfish at any combination of density or feeding rate through 6 weeks. When the density data was extrapolated and expressed as pounds/acre of crawfish, no clear differences existed in the average daily gain up to pond densities of about 850 lb/A. However, for weeks 8 through 12, density was the dominate factor affecting growth and final size. Although not statistically different, the higher feeding rates showed a trend in producing faster growth. Lower density or higher feeding rates generally resulted in significantly higher estimates of feed consumed, especially in the latter 6 weeks. However, at either density, consumption usually increased as feeding rates increased but with no significant increase in growth rate. This indicates that crawfish fed the higher rates may have obtained a higher percent of their nutritional requirements from the feed in lieu of foraging sufficiently from the pond's food sources. Feed efficiency usually was better in the higher density and/or with the lower feeding rates.

It should be noted that no economical considerations were appraised for this study but, based on biological findings, the cost effectiveness of feeding will probably depend on such things as crawfish density, season, feeding rates and timings, natural food resources and harvest strategies. Crawfish have the ability to obtain a considerable amount of their nutritional requirements from a properly managed forage-based system, therefore, feeding under this scenario would probably be of a supplemental nature. Interpretations from this study suggest that cost effectiveness of supplemental feeding would be most effective at higher population densities and at some moderate feeding rate when used in conjunction with adequate forage-based systems.

Table 1. Growth and feed consumption of crawfish (at two densities) fed a formulated feed at two feeding rates. Rice Research Station, Crowley, LA. 1991.

Density	Feed (lb/A/day) as is/dry	% Survival	Avg. weekly wt.(g)	Avg. daily gain (g)	Consumption (% of body wt) low	Consumption (% of body wt) high	Consumption (lb/A/day dry wt) low	Consumption (lb/A/day dry wt) high	Feed efficiency (g gain/ g feed) low	Feed efficiency (g gain/ g feed) high	Pond biomass (lb/A)
					Week 2						
1	5/4.6	100	0.88^{b}	0.03^{a}	3.4^{b}	9.3^{b}	0.4^{a}	1.1^{b}	0.5^{c}	1.4^{b}	11.5^{b}
1	20/18.6	100	0.98^{ab}	0.04^{a}	12.4^{a}	42.7^{a}	1.5^{a}	5.3^{a}	0.1^{c}	0.7^{b}	12.2^{b}
10	5/4.6	93	1.13^{a}	0.05^{a}	0.5^{b}	1.0^{b}	0.6^{a}	1.4^{b}	5.4^{a}	12.2^{a}	133.0^{a}
10	20/18.6	98	1.05^{a}	0.04^{a}	0.8^{b}	4.5^{b}	1.1^{a}	5.9^{a}	1.3^{b}	9.3^{a}	133.5^{a}
					Week 4						
1	5/4.6	100	2.88^{a}	0.14^{a}	1.0^{ab}	2.4^{b}	0.3^{b}	0.8^{c}	3.3^{bc}	7.7^{bc}	33.0^{b}
1	20/18.6	100	3.06^{a}	0.15^{a}	1.6^{a}	11.8^{a}	0.6^{b}	4.2^{b}	0.7^{c}	5.7^{c}	35.5^{b}
10	5/4.6	100	3.35^{a}	0.16^{a}	0.3^{c}	0.4^{c}	1.1^{ab}	1.6^{c}	18.1^{a}	27.1^{a}	401.0^{a}
10	20/18.6	100	3.33^{a}	0.16^{a}	0.6^{bc}	1.6^{bc}	2.6^{a}	6.2^{a}	4.8^{b}	14.3^{b}	390.2^{a}
					Week 6						
1	5/4.6	100	7.12^{a}	0.30^{a}	0.3^{a}	1.0^{b}	0.3^{c}	0.9^{d}	6.5^{b}	65.0^{a}	88.7^{b}
1	20/18.6	100	7.79^{a}	0.34^{a}	0.6^{a}	4.1^{a}	0.6^{c}	3.9^{b}	1.5^{c}	16.2^{a}	96.2^{b}
10	5/4.6	98	6.10^{a}	0.20^{a}	0.2^{a}	0.3^{c}	1.6^{b}	2.2^{c}	15.2^{a}	21.7^{a}	819.7^{a}
10	20/18.6	98	6.34^{a}	0.22^{a}	0.6^{a}	1.1^{b}	5.3^{a}	9.0^{a}	4.2^{bc}	7.2^{a}	840.0^{a}
					Week 8						
1	10/9.3	100	15.88^{a}	0.63^{a}	1.0^{c}	1.9^{b}	2.1^{c}	3.9^{d}	2.9^{b}	5.6^{a}	204.5^{d}
1	40/37.3	100	17.74^{a}	0.71^{a}	2.0^{a}	6.0^{a}	4.6^{b}	13.7^{b}	0.9^{c}	2.7^{b}	227.5^{c}
10	10/9.3	90	8.48^{b}	0.17^{b}	0.4^{d}	0.6^{c}	4.6^{b}	6.4^{c}	4.3^{a}	6.0^{a}	1170.0^{b}
10	40/37.3	90	10.63^{b}	0.31^{b}	1.2^{b}	1.9^{b}	16.0^{a}	25.2^{a}	1.9^{bc}	3.1^{b}	1352.2^{a}
					Week 10						
1	10/9.3	100	25.00^{a}	0.65^{a}	0.9^{c}	1.5^{c}	3.4^{c}	5.5^{c}	2.1^{b}	3.5^{ab}	364.3^{c}
1	60/56.0	100	25.24^{a}	0.54^{a}	1.6^{a}	5.3^{a}	6.3^{b}	20.2^{b}	0.5^{c}	1.6^{b}	383.0^{c}
10	10/9.3	90	10.60^{b}	0.16^{b}	0.3^{d}	0.4^{d}	4.4^{c}	6.6^{c}	3.8^{a}	5.7^{a}	1526.0^{b}
10	60/56.0	90	14.09^{b}	0.25^{b}	1.2^{b}	2.0^{b}	24.1^{a}	38.1^{a}	1.1^{bc}	1.7^{b}	1965.7^{a}
					Week 12						
1	10/9.3	50[1]	25.63^{a}	0.07^{a}	0.9^{b}	1.5^{c}	3.9^{c}	6.2^{c}	0.2^{b}	0.3^{b}	448.0^{c}
1	80/74.6	100	31.44^{a}	0.27^{a}	1.9^{a}	5.8^{a}	9.3^{b}	29.9^{b}	0.2^{b}	0.4^{b}	483.0^{c}
10	10/9.3	90	11.89^{b}	0.07^{a}	0.2^{c}	0.4^{d}	4.3^{c}	6.7^{c}	1.6^{a}	2.5^{a}	1832.2^{b}
10	80/74.6	90	15.83^{b}	0.12^{a}	1.2^{b}	2.0^{b}	28.6^{a}	48.1^{a}	0.4^{b}	0.7^{b}	2405.3^{a}

[1] Two crawfish of the four replicates were missing; it is not clear whether they escaped or died.

* Means followed by the same letter within a column are not significantly different.

EVALUATION OF "RELAYING" AS A MEANS OF INCREASING PROFITS IN CRAWFISH/RICE CULTURE

W. Ray McClain, Patrick K. Bollich, and Don Huffman

INTRODUCTION

A common problem in Louisiana crawfish culture is the production of small, low-market-value crawfish. This often occurs late in the season due to overpopulation and the depletion of vegetative food resources. With the recent advent of crawfish size grading and the establishment of national and international markets that demand large crawfish, producers of small crawfish are at an economic disadvantage.

There are approximately 115,000 acres devoted to crawfish production and over 500,000 acres devoted to rice production in Louisiana. Because of common resource requirements for both commodities, many producers of crawfish also cultivate rice commercially. Since rice is usually planted in early spring, the vegetative growth phase of rice production coincides with the time that forages often become depleted in crawfish ponds. This provides an opportunity to "relay" crawfish into an existing, more favorable environment to achieve further growth and larger crawfish.

This study was designed to examine the effectiveness of relaying small crawfish from poor production ponds to newly established rice fields (inter-cropping) where the crawfish are re-harvested at a larger size prior to rice maturity, after which, a subsequent rice crop is harvested.

MATERIALS AND METHODS

The rice variety 'Mars' was water planted on April 4, 1991 in a prepared seedbed in replicated fields (0.5 - 1 acre) according to recommended agronomic practices. When adequate vegetative height was reached (45 days after planting), the water level was raised to approximately 8 inches in the fields receiving crawfish. Rice was then at the panicle initiation (or green ring) stage. Small, low-market-value ($0.20/pound) crawfish harvested from commercial ponds were purchased and transferred to the new "ponds." Two stocking densities (500 and 1000 lb/A) were tested using three replicates. The average size of crawfish transferred was 30 count/lb (range, 28 - 36 count/lb). The remainder of the fields (checks) were managed for rice production alone. Fields receiving crawfish were flushed with an additional 9 acre-inches of water to maintained proper water quality for optimum crawfish growth.

After an appropriate time for growth, crawfish were re-harvested via baited traps (32 traps/acre). Trapping began on June 26, 1991 when sample catches revealed the average crawfish size had reached 15 count/lb and continued until the catch was no longer economically feasible. The traps were run 5 days per week (24 hr sets) for 3 weeks. All crawfish caught were mechanically graded and sorted into three market size categories. These categories, based on information obtained from a major crawfish purchasing and marketing company, were "export - grade" (< 15 count/lb), "restaurant - grade" (15-19 count/lb), and "peeler - grade" (> 19 count/lb).

At rice maturity (shortly after cessation of the crawfish harvest), the water was discharged and grain was combine harvested in all fields. Grain yield was recorded and adjusted to 12% moisture.

An economic analysis was performed on projected operating costs and returns, based on established crawfish/rice budgets and variables from this study. Income was based on total production and the current market value of rice and crawfish. Differential prices of $0.85/lb for "export," $0.50/lb for "restaurant," and $0.35/lb for "peeler" grades were assigned to the respective crawfish size groups. Rice was valued at $6.50 cwt with a deficiency payment of $4.21 cwt.

SUMMARY AND DISCUSSION

Crawfish Harvest

Average relay crawfish yields of 490 lb/A for the low and 797 lb/A for the high stocked ponds were collected from the relay operations (Table 1). Yields from the low density ponds corresponding to size partitions averaged 254, 206 and 30 lb/A for the "export," "restaurant," and "peeler" grades, respectively. For the same size categories, yields from the high density ponds averaged 278, 442, and 77 lb/A, respectively. Sizes of export, restaurant, and peeler grades averaged 12, 16, and 22 count/lb, respectively.

Total relay crawfish yields were similar to the total weights stocked; however, average individual crawfish size doubled. It is unclear why retrieval rates were not higher. A 24-hour mortality rate was measured after stocking and was estimated to be only 15.7%. Perhaps there was some delayed mortality after 24 hours. Some crawfish were left in the fields after harvesting ceased and some may have burrowed. The crawfish left in the field would serve as broodstock if plans were to flood the stubble following rice harvest for a more traditional fall/winter crawfish season.

Rice Harvest

The rice only fields yielded an average of 4954 pounds of rice per acre. The average rice yield of the relayed crawfish fields was significantly lower at 3655 lb/A. This was attributed to the loss of yields in the trapping lanes where rice was destroyed. Comparisons of sub-sample yield measurements from rice only fields and relay crawfish fields were not significantly different. This indicated that the presence of crawfish, even at high densities, had no negative impact on intrinsic rice yield.

Economic Analysis

Results of the economic analysis (Table 2) for this type of inter-cropping system demonstrated that average net returns were increased from $54/acre for rice alone to $125 and $174/acre for rice and relay crawfish at low and high population densities, respectively. The estimated increase in net returns from relaying was very substantial even without the higher crawfish retrieval rates. The loss of rice yield, due to area loss from trapping lanes, was more than offset by the economic gain from crawfish. This represents a substantial increase in potential net returns from relaying crawfish into rice fields in this non-traditional approach.

CONCLUSIONS

The results from this study are very encouraging for those producers who have the ability to, or who are already, culturing rice and crawfish. It would be especially logical for those producers who normally seed their rice fields with crawfish broodstock when they are in a crop rotation practice to consider relaying. The remaining crawfish left in the field from a relay operation would serve as brooders for the subsequent crawfish season. After the relay operation and rice harvest, the field could be managed according to recommended practices for a traditional rice/crawfish double crop.

Caution must be emphasized in the implementation of this non-traditional approach. Even though the results of this study are very encouraging, they are from one year's data. Further studies will be conducted under different environmental conditions.

Table 1. Average crawfish size and yield for each grade of crawfish harvested and average rice yield for each treatment. Rice Research Station, Crowley, LA. 1991.

	Crawfish Stocking Rate[1]						
	Low			High			
	Avg. size	Yield	% of Total	Avg. size	Yield	% of Total	Rice only
	(count/lb)	(lb/A)		(count/lb)	(lb/A)		(lb/A)
Export	11.7	254	52	12.7	278	35	----
Restaurant	15.5	206	42	16.3	442	55	----
Peeler	21.8	30	6	22.1	77	10	----
TOTAL		490			797		
Rice Yield		3713			3596		4954

[1] High stocking rate was 1000 lb of crawfish/A and low stocking rate was 500 lb of crawfish/A.

Table 2. Summary of estimated cost and returns per acre for rice only and rice/crawfish relay operations. Rice Research Station, Crowley, LA. 1991.

Item	Stocking Rate[1] High	Stocking Rate[1] Low	Rice Only
	------------(Dollars)	------------	------------
INCOME			
Crawfish (Export)	236	216	---
Crawfish (Restaurant)	221	103	---
Crawfish (Peeler)	27	10	---
Rice	234	241	322
Deficiency Payment	180	180	180
TOTAL INCOME	898	750	502
DIRECT EXPENSES			
Custom (Airplane, drying, storage)	100	105	128
Bait	15	15	---
Fertilizer	53	53	53
Herbicide	24	24	24
Labor	28	27	19
Other (sacks, etc.)	3	2	---
Seed (crawfish)	200	100	---
Seed (rice)	24	24	24
Diesel fuel	73	73	61
Gasoline	3	3	3
Repair and maintenance	40	40	36
Interest on Op. Cap.	11	10	9
TOTAL DIRECT EXPENSES	574	476	357
RETURNS ABOVE DIRECT EXPENSES	324	274	145
FIXED EXPENSES	150	149	91
TOTAL SPECIFIED EXPENSES	724	625	448
RETURNS ABOVE TOTAL SPECIFIED EXPENSES	174	125	54

[1] High stocking rate was 1000 lb of crawfish/A and low stocking rate was 500 lb of crawfish/A.

USE OF MOSQUITOFISH TO CONTROL WATER BOATMAN EGG INFESTATIONS ON CRAWFISH[1]

W. Ray McClain, Robert P. Romaire, Jay V. Huner

INTRODUCTION

The value of normally moderate-to-high-priced crawfish often becomes reduced dramatically due to an unsightly condition caused by an aquatic insect. The water boatmen, belonging to the order Hemiptera and family Corixidae, are small aquatic insects that lay eggs on clean, submerged surfaces, such as plants, sticks, etc., including crawfish. The insect can become abundant in the spring and often plagues crawfish producers by laying excessive numbers of eggs on large numbers of crawfish. The eggs do not normally harm crawfish but make them very unattractive. This substantially reduces their value for the whole boiled restaurant and export trade.

Water boatmen are readily eaten by small minnows, mosquitofish, that are commonly found in similar environments as crawfish. Since mosquitofish are very prolific and do not eat appreciable amounts of young crawfish, they may have potential as control agents for the water boatman in crawfish ponds. This study, as part of a coordinated study at three test sites, attempted to investigate this possibility.

MATERIALS AND METHODS

Fifteen small experimental crawfish ponds (about 0.4 acre in size) were planted with either rice, sorghum-sudan grass, grain sorghum, or sorghum-sudan grass and rice together. Of the rice planted ponds, some were planted early (June 25) and some were planted late (August 7). Also utilized for this study were two water supply laterals of about one acre in size which contained crawfish. All ponds were flooded on October 1 and managed similar to commercial crawfish ponds. Crawfish harvesting began in late February 1991 and continued through May.

Mosquitofish, Gambusia affinis, were stocked in randomly selected ponds of early planted rice, late planted rice, and sorghum-sudan grass at three stocking densities (0, 300, and 600 per acre) after crawfish harvesting began in late February. Additional ponds (grain sorghum and sorghum-sudan grass with rice) were stocked with mosquitofish at 0, 600, and 1200 per acre, and the two laterals were stocked with 0 and 600 mosquitofish per acre at the same time (Table 1).

Crawfish were sampled 2 weeks after the stocking of mosquitofish and biweekly thereafter until ponds were drained in May. All crawfish caught in ponds and a subsample (100 crawfish) from the laterals at each collection period were assessed as to the severity of infestation with water boatman eggs. These were categorized as no eggs, light, moderate, and heavy infestation based on interviews with crawfish processors and marketers.

[1] This research was funded in part by the Louisiana Crawfish Promotion and Research Board.

On two occasions, duplicate samples of crawfish with moderate to heavy infestation of water boatman eggs were placed and held for 3 days in a simulated spray-purge system to evaluate the effectiveness of the operation in removing the attached water boatman eggs.

SUMMARY AND DISCUSSION

A summary of the incidence and severity rate of infestation of crawfish with water boatman eggs from the 15 experimental crawfish ponds and two water supply laterals is included in Table 1. This table summarizes the average percent infestation category according to forage-type ponds at each stocking rate of mosquitofish and gives the overall averages for each stocking rate.

Very little water boatman egg problem existed on crawfish from the experimental ponds at the beginning of the collection period and only a slightly elevated problem was encounter from the laterals. The problem became more apparent in the laterals sooner (March) and peaked in the ponds by late April. The problem subsided somewhat by late May in both the ponds and laterals.

There appeared to be only a slight reduction in crawfish infestation rate with the stocking of mosquitofish. The higher stocking densities gave no additional benefit over the 300 per acre rate. There were some mosquitofish observed in ponds that were not stocked; however, a large population was not observed or sampled. Stocking of mosquitofish may be more effective in the fall to allow a population build-up prior to heavy infestation of water boatman in the spring.

Water boatman egg infestations were more pronounced on crawfish caught from the laterals than from the ponds. This was probably attributed to the lack of standing substrate (laterals had little to no forage substrates) onto which water boatman could lay eggs. Thus, a higher incidence and more severe infestation were found on crawfish. Crawfish ponds had much more standing vegetative substrates throughout the collection interval.

It was observed that crawfish of lighter color was more prone to have water boatman eggs present, although all crawfish sampled were P. clarkii or the red swamp crawfish. The mature dark red individuals generally had the least incidence and lowest severity of infestation. The reason for this is unclear.

The spray-purge system was observed to be ineffective in the removal of water boatman eggs on crawfish exoskeletons. There appeared to be some removal of eggs from the rostrum area after 24 hours. After 48 hours in the spray-purge system, crawfish had more of the eggs removed from the top of the carapace only. Eggs present on the side and lower edges of the carapace were not effectively removed even after 72 hours. The majority of egg deposits on moderate to heavy infested crawfish are on the sides and lower edges. In conclusion, the spray-purge system is highly ineffective in cleaning crawfish of water boatman eggs.

In summary, the introduction of mosquitofish to control the water boatman egg problem on crawfish was beneficial in doing this only slightly. Stocking rates over 300 fish per acre were not additionally effective. The lack of suitable substrate for water boatman to lay their eggs on in crawfish production areas appeared to cause a higher incidence and severity of eggs on crawfish. Lastly, the spray-purge systems seem to be ineffective in removing the eggs deposited on crawfish.

Table 1. Summary of water boatman infestation by stocking densities of mosquitofish. Rice Research Station, Crowley, LA. 1991.

Treatment (fish/acre stocked)	Average % infestation			
	None	Light	Moderate	Heavy
(0)				
Early Rice	97.46	2.54	0.00	0.00
Grain Sorghum	75.62	15.43	8.95	0.00
Late Rice	94.77	4.67	0.56	0.00
Sorghum-Sudan + Rice	88.39	9.38	2.23	0.00
Sorghum-Sudan	80.78	17.12	2.10	0.00
Lateral	51.16	31.88	16.81	0.14
Grand Avg.	77.06	16.49	6.41	0.04
(300)				
Early Rice	85.80	11.24	2.96	0.00
Late Rice	92.26	6.89	0.70	0.14
Sorghum-Sudan	75.60	19.76	4.64	0.00
Grand Avg.	85.47	12.06	2.40	0.07
(600)				
Early Rice	84.26	14.47	1.28	0.00
Grain Sorghum	69.35	24.83	5.59	0.22
Late Rice	89.76	10.11	0.13	0.00
Sorghum-Sudan + Rice	96.54	3.24	0.22	0.00
Sorghum-Sudan	82.53	16.93	0.53	0.00
Lateral	54.83	27.10	17.25	0.82
Grand Avg.	80.28	15.79	3.77	0.16
(1200)				
Grain Sorghum	98.25	1.31	0.44	0.00
Sorghum-Sudan + Rice	77.52	20.30	2.04	0.14
Grand Avg.	82.45	15.78	1.66	0.10

DEVELOPMENT OF A WATER-BASED CRAWFISH GRADER

W. Ray McClain, Sam Rollason, Donnie Stutes, and Mike Dronet

INTRODUCTION

Only recently have crawfish producers been paid a substantial price differential for separate sizes of crawfish harvested. Previously, there was no incentive for producers to grade crawfish. It was only after the development of export markets and the demand for a graded product in the live-boiled and restaurant trades that brokers and processors became serious about actively grading crawfish instead of relying on supplies of different uniform sizes from ponds. Today, some receiving stations grade crawfish and pay the producer accordingly, but many still grade the product and retain the economic incentive without passing it on to the producer.

There are several commercial type graders on the market and various other "shop made" units in use. These units all use variable bar spacings that "size" crawfish. However, in Louisiana, all present grading machines grade crawfish out of water and out of their natural environment. The consequence of grading live crawfish out of their natural environment (water) is that they tend to grasp and hold on to one another with their chelae. As a result, many smaller crawfish are kept from passing through the appropriate bar spacings and end up in an inappropriate size group. In other words, the present grading processes are inefficient in sorting crawfish correctly, and often there are size contaminations to the larger grades. This must be dealt with by regrading or hand sorting; either way it can be costly. Stress on the crawfish may also be a factor in grading environments. Young crawfish have the ability to release their chelae in certain stressful situations.

This project was initiated to investigate an alternative grading concept that would compete with existing models in cost and speed but give a more accurate (cleaner) grade separation. It was the intent to develop a prototype that could be appropriately scaled for use by either a farmer, broker, processor, retailer, or restauranteur.

Procedure

Prototype #1

The new concept for grading crawfish is based on a passive grading system. This is accomplished by allowing crawfish to grade themselves in their natural environment or under water taking advantage of their natural behavioral response. A small prototype was first designed and built to test only the concept. This unit consisted of a small rectangular tank that held water. A slightly smaller removable section, made up of three stacks of horizonal grates, was built to slip inside the tank. The grates are actually a plane of parallel bars with each plane of bars separated by about 12 inches. The spacing of bars for the top grate is the largest, a smaller spacing is used for the middle, and even smaller spacing is used for the bars of the bottom grate. The plane of bars is fixed and is connected to the removable section that can be placed inside the tank or lifted out in one piece. When placed inside the tank filled with water, the top grate is 4 to 5 inches under water. Bar spacings were designed to be adjustable on this first prototype.

A group of mixed crawfish was placed in the water above the top grate. Soon after release, the crawfish instinctively tried to migrate to the bottom of the tank. They were impeded only when the spacings between bars were small enough to halt their descent, thus crawfish were grouped or sized by the three grates. Large crawfish were held by the top grate, medium crawfish by the middle grate, and small crawfish by the bottom grate. Crawfish were removed by lifting the removable section out of the water where they remained separated into their respective size grades until they were expelled.

Spacing of the bars was predetermined using data from existing crawfish graders and determination of average grade sized by measurement of samples. Approximately 2,500 lb of crawfish were subjected to this grader, and average size yields were 12.7, 16.3, and 22.1 crawfish/lb for top, middle, and bottom grates, respectively. All grades appeared to be sorted quickly and effectively with little size contamination.

Prototype #2

The preliminary results demonstrated that passive grading of crawfish into multiple grades was possible under these conditions. The next phase involved the design and building of a larger working model with an effective delivery system for the graded crawfish (Fig. 1). This was accomplished based on modifications of the first prototype and additional design considerations. The delivery mechanism employed in this model is composed of a series of three chutes, one each conforming to the end of each grate and opening at different locations when the crawfish above each grate are emptied (Fig. 2). The dumping (unloading of crawfish) on this model is achieved when the inside section (grader box, composed of three fixed platforms of grates) is lifted. This grader section is hinged at one end and lifted and tilted by two hydraulic rams. As this section is raised out of the water, the crawfish on each grate slide down toward the chutes. The crawfish pass through the chutes to respective compartments on a receiving platform where they can be sacked.

This model was designed to easily grade 40 to 60 lb of crawfish per dump and could be scaled up or down in size depending on need. It will be tested through an entire crawfish season for size grade yields, speed, mortality to crawfish, ability to clean crawfish, and effects on shelf life of crawfish subsequently kept in a cooler.

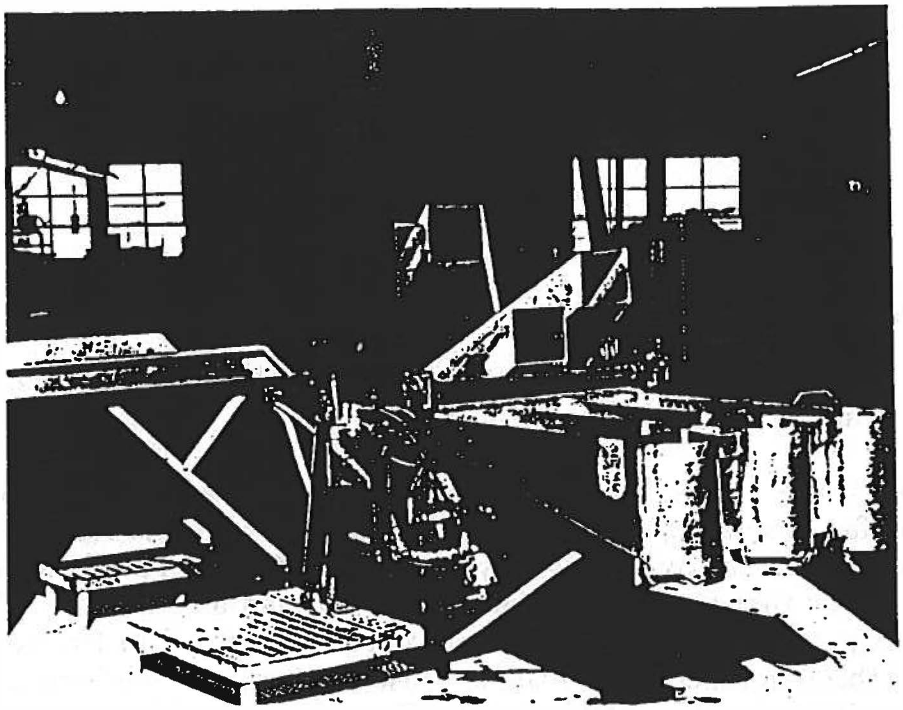


Figure 1. Water-based crawfish grader prototype developed by the Louisiana State University Agricultural Center, Rice Research Station. 1991.

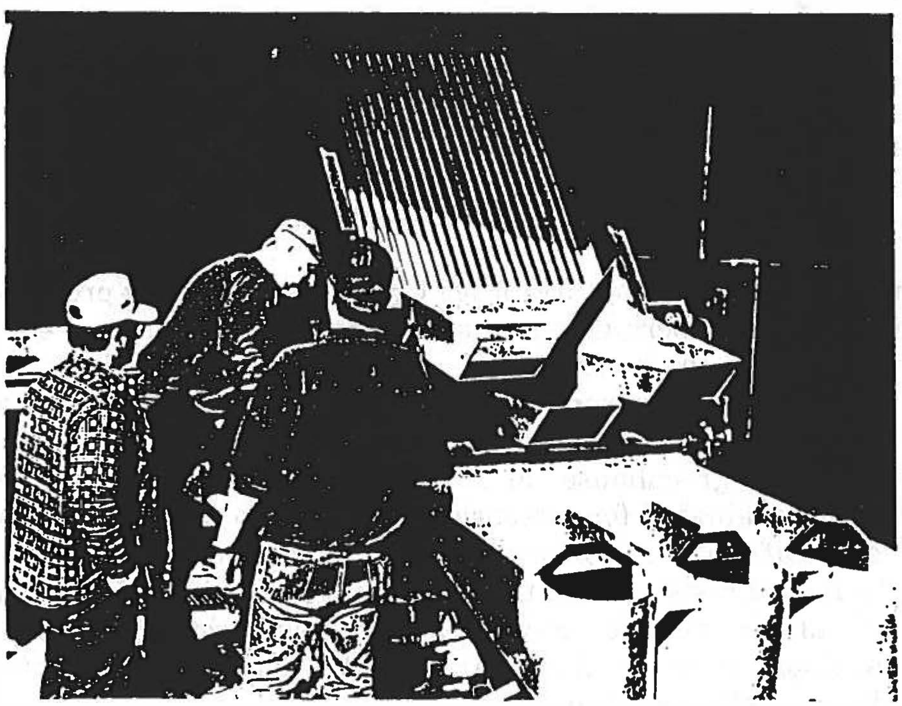


Figure 2. Illustration of emptying mechanism for delivering three size grades of crawfish after under-water grading. 1991.

FORAGE CROPS BIOTECHNOLOGY RESEARCH

S. S. Croughan

Evaluation of Alfalfa Somaclones

S.S. Croughan, P.D. Colyer, S.S. Quisenberry, D.J. Moellenbeck, J.T. Simons, and B. Marquis

The Forage Crops Biotechnology project has developed numerous alfalfa somaclones for evaluation for improved germplasm over the last 6 years. These variants were produced by plating cotyledons from 7 day old seedlings onto nutrient medium. Callus that formed was transferred through a series of 3 different media to trigger regeneration of plants. Plants were maintained in the greenhouse and propagated through vegetative cuttings. Most of this material has been evaluated for increased resistance to the alfalfa weevil (*Hypera postica*), the threecornered alfalfa hopper (*Spissistilus festinus*), spring black stem and leaf spot (*Phoma medicaginis*) and Leptosphaerulina leaf spot (*Leptosphaerulina briosiana*). Approximately 15 somaclones were identified with increase resistance to one of the insects, and about 30 somaclones have potential increased disease resistance. Ten of these somaclones have been sent to an alfalfa breeder for genetic analysis of the resistance and production of advanced generation seed for further development of resistant germplasm.

Evaluation of Bermudagrass Somaclones

S.S. Croughan, P.D. Colyer, S.S. Quisenberry, J.T. Simons, and B. Marquis

During the last 6 years, the Forage Crops Biotechnology project has produced several thousand hybrid bermudagrass somaclones. Two sources of explant material were used for culture initiation, stolon nodes and immature inflorescence. Once callus was produced the cells were transferred through a series of media in which the hormones were gradually reduced to trigger plant regeneration. Plants are maintained in the greenhouse and propagated through vegetative cuttings. Somaclones were evaluated for increased resistance to fall armyworm (*Spodoptera frugiperda*) and leaf spot (*Bipolaris cynodontis*). Approximately 7% of the somaclones tested had increased resistance to the insect and approximately 10% had increased resistance to leaf spot disease. Several hundred somaclones are still under initial evaluation, and somaclones with potential resistance are undergoing further tests to determine the level of resistance.

SOYBEAN BIOTECHNOLOGY RESEARCH

S. S. Croughan

Production of Soybean Somaclones

S.S. Croughan, J.T. Simons, and B. Marquis

Seeds were collected from somaclonal variants produced through tissue culture and given to Dr. Harville, LAES soybean breeder, for seed increase. The lines will be field tested next spring. New methods for improving the efficiency of somaclone production were evaluated. Two auxins, 2,4-dichlorophenoxyacetic acid (2,4-D) and naphthalene acetic acid (NAA), were compared at different concentrations to evaluate the effect on embryo production in three varieties. 2,4-D produced more embryos than NAA at high concentrations and the two auxins produced similar numbers of embryos at lower levels. Both produced more embryos as the concentration of auxin increased. The three varieties responded the same on treatments with 2,4-D, but there was a large difference between varieties in the number of embryos produced with NAA treatments. Additional experiments compared four methods of somaclone production utilizing nine different germplasms. All methods produced embryos for most genotypes using immature cotyledons (94% produced embryos) or immature embryos (77% produced embryos) as the explant source. However, only one method consistently produced embryos that completed development into plants that reached maturity and produced seed. The number of embryos produced was higher 84% of the time when immature cotyledons were used instead of immature embryos as the explant source. One of the genotypes evaluated produced significantly more embryos than the others in all of the tested methods.

Soybean Anther Culture

S.S. Croughan, J.T. Simons, and B. Marquis

This year several experiments were conducted to establish an anther culture system for soybeans. Last year callus initiation medium was developed that gave high rates of callus formation. This year, approximately 3,000 anthers were plated onto this initiation medium, and calli that formed were transferred to 35 regeneration media. Half were placed in the light, and half in a dark incubator. With this experiment the effect of three concentrations of indoleacetic acid or naphthalene acetic acid in combination with five concentrations of benzylaminopurine were evaluated. While no regeneration occurred, dark incubation with low levels of indoleacetic acid and any level of benzylaminopurine produced a more desirable callus type. In another experiment different germplasm sources were tested to evaluate varietal differences in response to culture. Thirty-four different germplasm sources, involving approximately 27,000 anthers, were plated onto callus initiation medium. For three varieties, three other initiation media were tested, as well as three different plating densities of anthers. The original callus initiation medium developed was the best, giving callus formation rates from 16 to 91% with an average of 52%. A plating density of 10 anthers per 15 ml of medium gave the highest callus formation rate.

Soybean Genetic Engineering

S.S. Croughan, Q. Xie, J.T. Simons, and B. Marquis

With completion of the genetic engineering laboratory, research with soybeans was initiated this summer. Ten different genotypes were evaluated for ability to form protoplasts, callus, and regenerate to plants, steps necessary to produce transformed plants through protoplasts. There is a strong varietal effect, with some varieties not forming protoplasts, or callus, while others form excellent protoplasts and callus. Regeneration studies are still underway. Genetic engineering experiments in progress will attempt to alleviate the varietal effect so that genetic engineering techniques can be applied to all varieties. Plasmids were obtained from Dr. Jesse Jaynes in the Biochemistry Department of LSU, including one that codes for a peptide shown to provide disease resistance. This peptide was shown to be effective against several organisms, including *Rhizoctonia solani*, the organism responsible for Rhizoctonia root rot and aerial blight in soybeans. This peptide, when genetically engineered into potatoes, was found to be effective in providing increased disease control. We will attempt to genetically engineer soybeans with this disease resistance gene.

This research is supported in part by funds provided by Louisiana producers through the Louisiana Soybean and Grain Research and Promotion Board.

INTERNATIONAL RICE TRAINING PROGRAM

Joseph A. Musick

The Rice Research Station has cooperated for a number of years with the Foreign Training Division of the International Agricultural Development Service by providing an information training program for international leaders, government officials, farmers, students, and others interested in the production, processing, and marketing of rice.

Data regarding the classification of visitors according to countries are presented in Table 1. A total of 169 participants, representing 21 countries, were guests at the Rice Research Station in 1991. This was an increase of 61 participants compared with 1990. Belgium provided the largest number of visitors (72) again this year.

Table 1. Number of participants by country. Rice Research Station, Crowley, LA. 1991.

Country	Number of participants
Argentina	5
Australia	1
Bangladesh	14
Belgium	72
Brazil	34
China	9
Czechoslovakia	2
Ecuador	3
Egypt	2
Germany	2
Hungary	1
Japan	4
Panama	1
Philippines	1
Poland	1
Russia	5
Trinidad	1
Uruguay	2
Venezuela	1
West Africa	7
Yugoslavia	1
TOTAL	169

Table 2 presents information regarding the number of participants according to sponsoring organizations. The largest number was sponsored by the City of Rayne (72).

Subject matter of interest to the participants varied from general rice production practices to specific interests, such as plant breeding, water management, processing, marketing, and control of rice diseases, insects, and weeds. There was also interest in biotechnology, rice genetics, milling, and grading.

Table 2. Number of visitors by sponsoring organizations. Rice Research Station, Crowley, LA. 1991.

Sponsoring organization	Number sponsored
Governments (Foreign)	4
IFDC	14
International Programs	1
Louisiana State University	5
OICD	1
Private Companies	30
Rayne (City of)	72
Rotary International	6
Self	24
US Rice Council	9
USAID	2
USIA/USDA	1
TOTAL	169

ECONOMICS OF ENTERPRISE SELECTION AND WHOLE FARM DECISION MAKING IN THE LOUISIANA RICE GROWING AREAS[1]

Arthur M. Heagler and G. Grant Giesler[2]

Enterprise budget projections for 1992 were developed for rice, soybeans, milo, corn, wheat, and wheat-soybean double cropping systems. A summary of the enterprise budgeting analysis for rice in Louisiana is presented in Table 1. Budgeting results for the other enterprises in Southwest Louisiana are shown in Table 2. Owner-operator and tenant-operator situations were budgeted for each enterprise, and other than for rice, all enterprises were valued at a projected market price. Rice income was calculated by adding the product of the loan price of $6.50 per hundredweight and the actual yield to the deficiency payment. The deficiency payment was calculated by multiplying the area average proven yield times the difference between the target price and the loan value, $4.21 per hundredweight.

Under these assumptions, sufficient revenue was available to cover direct expenditures for all rice enterprises. All other enterprises yielded positive returns over direct expenses with the exception of tenant operator soybeans. Direct expenditures were defined to be seed, fuel, fertilizer, labor, chemicals, maintenance on equipment, and interest on operating capital. Total specified expenses include direct expenditures, the annualized cost of replacing capital assets, and interest on non-operating capital. Those enterprises that did not generate sufficient income to cover total specified expenses were all soybean enterprises, the milo and corn tenant situations, and the rice second cutting enterprise. It should be noted that total specified expenses do not include an estimation of per acre overhead costs. When these costs are included, only the owner-operator wheat-soybean double crop, owner-operator Central rice and owner-operator Northeast rice (both drill and water planted) show positive returns.

Detailed enterprise budgets and supporting data were published in A.E.A. Information Series Number 101, January, 1992.

Service enterprise budgets were prepared for several alternative rice irrigation systems in Louisiana. For Southwest Louisiana, cost estimates were developed for diesel, electric, and natural gas power systems. Deep well and surface water sources for each of the above power systems were evaluated. Per acre inch direct irrigation costs with water planted rice for a deep well water source were estimated to be approximately $1.93, $2.75, and $1.54 for diesel, electric, and natural gas systems, respectively. Total per acre inch irrigation costs for deep well systems were estimated to be approximately $3.11, $3.73, and $2.71 for diesel, electric, and natural gas power units, respectively. Per acre inch direct irrigation costs with water planted rice for a surface irrigation water source were estimated to be approximately $0.85, $1.05, and $0.67 for diesel, electric, and natural gas systems, respectively. Total per acre inch irrigation costs for surface systems were estimated to be approximately $1.51,

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[1]Research supported in part by funds provided by Louisiana rice producers through the Louisiana Rice Research Board.

[2]Professor and Research Associate, respectively. Department of Agricultural Economics and Agribusiness, Louisiana Agricultural Experiment Station, Louisiana State University Agricultural Center, Baton Rouge, Louisiana.

$1.59, and $1.31 for diesel, electric, and natural gas power units, respectively.

For Northeast Louisiana, cost estimates were developed for diesel and electric power systems using both deep well and surface water sources. Per acre inch direct irrigation costs with drill planted rice for a deep well water source were estimated to be approximately $0.62 and $0.86 for diesel and electric systems, respectively. Total per acre inch irrigation costs for deep well systems were estimated to be approximately $1.11 and $1.24 for diesel and electric power units, respectively. Per acre inch direct irrigation costs with drill planted rice for a surface water source were estimated to be approximately $ 0.52 and $0.53 for diesel and electric systems, respectively. Total per acre inch irrigation costs for surface systems were estimated to be approximately $0.88 and $0.77 for diesel and electric power units, respectively. For Central Louisiana, cost estimates were developed for water planted rice with a deep well water source and a diesel power unit. Per acre inch direct and total irrigation costs for this system were $1.04 and $1.67, respectively.

Detailed results of the irrigation cost analysis are reported in A.E.A. Information Series Number 101, January 1992.

1990 yield and cultural practice data from an ongoing study evaluating different methods of water weevil control, were analyzed during early 1991. The methods of water weevil control examined were 1) check plot, 2) one treatment of carbofuran, 3) two treatments of carbofuran, 4) water removal at threshold infestation level and 5) water removal seven days after threshold infestation level. The highest yields were associated with treatment 4, followed by treatments 5, 2, 3 and 1, respectively. Using procedures analogous to those utilized in A.E.A. Information Series 101, enterprise budgets incorporating cultural practices specific to each treatment were constructed for each regime. Results show that although treatment 4 possessed the highest fixed and total costs, its higher yield was more than sufficient to offset those higher costs. Therefore, treatment 4 had higher net returns than the other treatments. A summary of the economic analysis is provided in Table 3.[3]

During 1991, work has continued on resolving the disparity in rice production cost projections that exist between the Economic Research Service (ERS) and Land Grant Universities in the Delta States. A national conference on Economic Accounting for Commodity Costs and Returns, sponsored by the Farm Foundation, ERS, Federal Extension Service (FES) and the American Agricultural Economics Association (AAEA) was held in Kansas City, February 20-22, 1991. This conference dealt with the disparity problems we had addressed a year earlier. Participants requested the AAEA to form a task force to address this problem. This group will meet early in 1992.

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[3]Research conducted by Brian McManus, former research associate, Department of Agricultural Economics and Agribusiness, Louisiana Agricultural Experiment Station, Louisiana State University Agricultural Center, Baton Rouge, Louisiana.

Table 1. A Summary of Projected Costs and Returns per Acre for Rice Production in Louisiana, 1992

Crop Description	Yield Per Acre	Unit	Total Income	Direct Expenses	Returns Over Direct Expenses	Fixed Expenses	Total Expenses	Returns Over Total Expenses
			Dollars per Acre					
Rice Enterprises: a/								
Southwest Louisiana								
Water Plant, Owner b/	46.10	cwt.	479.25	366.93	112.32	89.89	456.82	22.43
Water Plant, Tenant c/	27.66	cwt.	287.55	232.36	55.19	48.51	280.87	6.68
Drill Plant, Owner b/	48.55	cwt.	495.17	349.19	145.98	93.74	442.93	52.24
Drill Plant, Tenant c/	29.13	cwt.	297.10	218.40	78.70	52.36	270.76	26.34
Second Cutting	12.00	cwt.	78.00	65.05	12.95	17.17	82.22	-4.22
Northeast La								
Water Plant, Owner b/	48.60	cwt.	477.10	285.68	191.42	68.08	353.76	123.34
Water Plant, Tenant c/	29.16	cwt.	286.26	230.35	55.91	48.48	278.83	7.43
Drill Plant, Owner b/	48.60	cwt.	477.10	280.45	196.65	73.37	353.82	123.28
Drill Plant, Tenant c/	29.16	cwt.	286.26	222.91	63.35	53.77	276.68	9.58
Central Louisiana								
Water Plant, Owner b/	43.50	cwt.	444.41	307.73	136.68	65.69	373.42	70.99

a/ Income for rice was calculated by adding the product of the loan price of $6.50 per hundredweight and the actual yield to the deficiency payment. The deficiency payment was calculated by multiplying proven yield times the difference between the target price and the loan value, $4.21 per hundredweight.

b/ Land costs are not included for the owner-operator

c/ Rental arrangements for rice in Southwest Louisiana were 1/5 crop share for land and 1/5 crop share for water with both landlord and waterlord paying 1/5 of fertilizer, chemicals, and drying and storage costs and the waterlord paying all of the irrigation fuel. Rental arrangements for rice in Northeast Louisiana were 1/5 crop share for land and 1/5 crop share for water with the waterlord paying all irrigation fuel costs and both the landlord and waterlord paying 1/5 of the drying and storage costs.

Table 2. A Summary of Projected Costs and Returns per Acre for Soybean, Corn, Milo Wheat, and Wheat-Soybean Double Crop Production, Southwest Louisiana, 1992.a/

Crop Description	Yield Per Acre	Unit	Total Income	Direct Expenses	Returns Over Direct Expenses	Fixed Expenses	Total Expenses	Returns Over Total Expenses
			----------------Dollars per Acre					---------------
Soybean Enterprises:								
6-Row, Owner b/	24.50	bu.	134.75	119.49	15.26	36.56	156.05	-21.30
6-Row, Tenant c/	19.60	bu.	107.80	118.07	-10.27	36.56	154.63	-46.83
Drill Plant, Owner b/	27.00	bu.	148.50	126.60	21.90	35.45	162.05	-13.55
Drill Plant, Tenant c/	21.60	bu.	118.80	124.99	-6.19	35.45	160.44	-41.64
Corn Enterprises:								
6-Row, Owner b/	100.00	bu.	250.00	169.26	80.74	40.14	209.40	40.60
6-Row, Tenant c/	80.00	bu.	200.00	165.46	34.54	40.14	205.60	-5.60
Milo Enterprises:								
Drill Plant, Owner b/	44.43	cwt.	171.06	111.71	59.35	29.46	141.17	29.89
Drill Plant, Tenant c/	35.54	cwt.	136.84	111.71	25.13	29.46	141.17	-4.33
Wheat Enterprises:								
Drill Plant, Owner b/	45.00	bu.	146.25	88.95	57.30	27.14	116.09	30.16
Drill Plant, Tenant c/	36.00	bu.	117.00	88.95	28.05	27.14	116.09	.91
Wheat-Soybean Double Crop								
Wheat-Soybean, Owner b/	45+25	bu.	283.75	148.95	134.80	48.16	197.11	86.64
Wheat-Soybean, Tenant c/	45+25	bu.	227.00	149.25	77.75	48.16	197.41	29.59

a/ Crop Prices used were \$5.50 per bushel for soybeans, \$2.50 per bushel for corn, \$3.85 per hundredweight for milo, and \$3.25 per bushel for wheat.

b/ Land costs are not included for owner-operators.

c/ Rental arrangements for soybeans, corn, milo and wheat were 1/5 crop share for land with the landlord paying 1/5 of any drying and storage costs.

Table 3. Average yields and projected income, costs, and returns per hectare and benefit-cost and cost-income ratios, Rice Research Station, Crowley, LA, 1991.a/

	Check	Carbofuran	Carbofuran+ carbofuran	Removal @ thresh	Delayed water
Yield (kg/ha)	5759	6556	6160	7125	6626
Gross Revenue ($/ha)	1269	1383	1326	1465	1393
Direct Costs ($/ha)	1025	1095	1117	1130	1077
Returns over direct costs ($/ha)	244	288	209	335	316
Fixed costs ($/ha)	335	335	335	352	340
Total costs ($/ha)	1359	1430	1452	1482	1417
Net returns over total costs ($/ha)	-91	-47	-126	-17	-24
Benefit/cost ratio	0.933	0.967	0.913	0.988	0.983
Cost/income ratio	1.071	1.034	1.095	1.012	1.017

a/ Carbofuran = carbofuran applied (0.56 kg [A.I.] per ha) at rice water weevil threshold (5 larvae per core) 8 June 1990; carbofuran + carbofuran = carbofuran applied at threshold 8 June and 29 June (re-treatment indicated, larvae exceeded threshold) 1990; removal @ thresh = water removed 8 June and reflooded 22 June 1990; delayed water = water removed 7 days post-threshold on 15 June and reflooded 29 June 1990.

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Randal K. Morgan
Research Farm Specialist II

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Research Farm Specialist II

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Wayne C. Faulk (continued) - - - - - - - - - - - - - - - Farm Manager
Instructor

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Research Farm Specialist II

Andrus Stutes
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Kenneth J. Trahan
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Donald E. Groth - Plant Pathology
Associate Professor

Marty Frey
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Joseph Nugent
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Research Associate

Steven D. Linscombe - - - - - - - - - - - - - - - - - - Rice Breeding
Assistant Professor

Farman Jodari - Rice Breeding
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KELLY TAYLOR
RESEARCH ASSOCIATE

M. FRED MILLER[3] - - - - - - - - - - - - - - - - - - RICE PROCESSING
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MELVIN LAWRENCE
RESEARCH FARM MAINTENANCE REPAIRER

LAWRENCE M. WHITE, III - - - - - - - - - - - - FOUNDATION SEED RICE
RESEARCH ASSOCIATE

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[1] RESIGNED 03/11/91
[2] APPOINTED 06/03/91
[3] RETIRED 12/31/91
[4] APPOINTED 10/91
[5] DECEASED 10/22/91

Cooperating personnel responsible for research projects at the Rice Research Station include the following:

Lucas Aviles ---------------------------------- Rice Research
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Lajas, PR

John B. Baker ---------------------------------- Weed Control
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Louisiana State University Agricultural Center

Richard L. Bengtson ---------------------------- Water Quality
Department of Agricultural Engineering
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Marc A. Cohn -------------------------------- Red Rice Control
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Patrick D. Colyer ---------- Bermudagrass and Alfalfa Diseases
Red River Research Station

Steve Crawford --------------------------------- Weed Control
Northeast Research Station

Marcus M. Eichhorn, Jr. ------------------------ Forage Crops
Hill Farm Research Station

Sam E. Feagley --------------------------------- Water Quality
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James R. Fuxa ----------------------------- Insect Biocontrol
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David B. Jones ---------------------------------- Rice Breeding
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Sharron S. Quisenberry -------- Rice and Forage Insect Control
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